

## **APPENDIX A**

### **QUALITY ASSURANCE SAMPLING PLAN (QASP)**



9522766

**QUALITY ASSURANCE SAMPLING PLAN**  
**FOR**  
**SITE REASSESSMENT**  
**DELTA SHIPYARD**  
**200 DEAN COURT**  
**HOUMA, TERREBONNE PARISH, LOUISIANA**

Prepared for

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# 1. INTRODUCTION

Weston Solutions, Inc. (WESTON®), the EPA Region 6 Superfund Technical Assessment and Response Team (START-3) contractor, has been tasked by the U.S. Environmental Protection Agency (EPA) Region 6 Prevention and Response Branch (PRB) under Contract No. EP-W-06-042 and Technical Direction Document (TDD) No. TO-0019-11-10-1 (Appendix F) to perform Site Reassessment (SR) activities at the Delta Shipyard site located off Industrial Boulevard, at 200 Dean Court in Houma, Terrebonne Parish, Louisiana. A Site Location Map is provided as Figure 1-1. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database number assigned to the Delta Shipyard Site is LAD058475419. START-3 has prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work (SOW) to be completed as part of the SR.

## 1.1 PROJECT OBJECTIVES

START-3 is providing technical assistance to EPA Region 6 for performing the SR to collect the data necessary to support EPA's determination that the site presents a threat to public health or welfare of the United States or the environment in accordance with *40 Code of Federal Regulations (CFR) 300.415*.

The primary objectives of this reassessment are the following:

- To identify potential threats that hazardous substances attributable to the site may pose to human health and the environment. The existence and migration of hazardous substances will be determined by identifying the receptors, or targets, potentially exposed to the hazardous substances.
- To determine the nature and extent of site-related contamination in known or suspected on-site waste sources. This information will be used if emergency removal activities are required.

The SR objectives will be achieved by collecting and analyzing the following:

- Waste source samples.
- Surface water and sediment samples from background, on-site, and downgradient locations.

- Surface and subsurface soil samples from on-site locations.

The samples will be collected to delineate the extent of contamination both horizontally and vertically to a depth of approximately 8 feet below ground surface (bgs) or until refusal. Surface and subsurface soil sampling will be collected along the outer perimeter of the containment berms to determine if source contamination has migrated from the impoundment area. The collected samples will be analyzed for site-specific Contaminants of Concern (CoCs), identified in previous investigations, including polycyclic aromatic hydrocarbons (PAHs), barium, and arsenic. The PAHs of concern include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene.

The data and information collected by START-3 during the SR will be used for two purposes. First, is to evaluate the site using the Hazard Ranking System (HRS) and to assist in determining whether the site is a potential candidate for inclusion on the National Priorities List (NPL). The intent of the SR is to provide documentation necessary to either rank the site on the NPL or assign a “No Further Remedial Action Planned” (NFRAP) status. The site-specific screening levels for the HRS data package will be three times the maximum background sample concentrations.

Secondly, if a NFRAP status is assigned to the site, the information collected by START-3 during the SR will be used to characterize and determine the estimated volume of material that may require removal during an emergency removal action. Soil sample results will be compared to EPA Region 6 Residential and Industrial Soil Screening Levels (Appendix E). Waste sample results will be used to characterize the source material, estimate volumes, and determine the appropriate disposal method if an emergency removal action is required.

## **1.2 PROJECT TEAM**

The Project Team will consist of START-3 personnel including David Bordelon as the Scope of Work Leader, Michelle Brown as the START-3 Site Assessment Project Team Leader (PTL), Jeffrey Wright as START-3 Removal Assessment PTL, a Field Safety Officer (FSO), a Data Manager, and additional START-3 Field Team Members to assist with sampling activities. The

PTLs will be responsible for the technical quality of work performed in the field and will serve as the START-3 liaisons to EPA Region 6 Task Monitors during the site activities. The PTLs, with the concurrence of EPA, will determine the precise location for sample collection in the field, collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. The Data Manager will be responsible for entering samples collected into SCRIBE; producing accurate chain-of-custody documentation for the samples during the assessment; and entering daily operations and sample collection data into the Regional Response Center–Enterprise Data Management System (RRC-EDMS) Response Manager software. The PTLs will oversee packaging and shipping of samples to either an EPA-designated Contract Laboratory Program (CLP) laboratory, EPA Region 6 Environmental Services Branch (ESB) Laboratory located in Houston, Texas, or a contracted private laboratory. The START-3 FSO will also be responsible for providing overall site health and safety support during the removal assessment field activities.

### **1.3 QASP FORMAT**

This QASP has been organized in a format that is intended to facilitate and effectively meet the objective of the removal assessment. The QASP is organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Methods
- Section 5 – Data Validation
- Section 6 – Quality Assurance

Tables are included at the end of each representative section. All figures are provided as separate Portable Document Format (PDF) files. Appendices are attached with the following information:

- Appendix A EPA Contract Laboratory Program Guidance for Field Samplers
- Appendix B Site-Specific Data Quality Objectives
- Appendix C WESTON and ERT Standard Operating Procedures
- Appendix D Laboratory Analyte List and Reporting Limits
- Appendix E EPA Region 6 Regional Screening Levels

- Appendix F TDD No. TO-0019-11-10-1 and Amendments A - C

## **2. SITE BACKGROUND**

Information regarding the site location, description, and site history are included in the following subsections.

### **2.1 SITE LOCATION AND DESCRIPTION**

The former Delta Shipyard site (Site) is located at 200 Dean Court in southeastern Houma, Terrebonne Parish, Louisiana. The geographic coordinates of the site are Latitude 29.565818° north, Longitude 90.705141° west. The Site can be reached by traveling south on U.S. Highway 90 from New Orleans to Houma. Turn east on Main Street and travel approximately 0.75 miles to Grand Caillou Road. On Grand Caillou Road, travel approximately 2.2 miles to Industrial Boulevard. On Industrial Boulevard turn west and, after approximately 1.5 miles, turn south on Dean Court. A Site Area Map is included as Figure 2-1.

The site is located on property owned by Elevated Boats, Inc. (EBI). The area of concern consists of three evaporation pits located approximately 800 feet south of the EBI fabrication building and east of Dean Court Road. The outer perimeter of Pits 1 through 3 measures approximately 850 feet by 150 feet. Historical records indicated that a fourth pit was present on-site and located approximately 250 feet west of Pit 3. Pit 4 is currently filled-in with dirt and overgrown with grass. The outer perimeter of Pit 4 measures approximately 465 feet by 360 feet. The Delta Shipyard site is located within an industrial area in Houma, Louisiana. The site is not fenced, nor is there any site security to limit public access to the site. The site is bordered to the north by EBI, to the east by Company Canal waterway, to the south by an industrial crane company (F&M Marco, Inc.), and to the west by Bayou LaCarpe. The majority of the land surrounding Pits 1 through 3 is covered by overgrown vegetation, shrubs, and trees. The area associated with Pit 4 is an open field overgrown with grass. There are no surface drainage, containment, or diversion structures that would prohibit the migration of on-site contamination in the surface soil from migrating off-site.

The topography at the site slopes to the southeast toward the Company Canal waterway. Surface water sheet flows off-site within drainage ditches along Dean Court and then proceeds east along the southern border of the property into Company Canal waterway.

There are no known registered monitoring wells located within the area.

For the purposes of this QASP, the Site will be defined as outlined in the HRS (Section 1.1, Definitions), as “[a]rea(s) where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located.” The Site consists of the three pits (Pits 1 through 3, also called impoundments) and the area surrounding them. This Site area is approximately 4.8 acres.

## **2.2 SITE HISTORY**

The former Delta Shipyard was owned by Delta Ironworks, Inc. Delta Ironworks, Inc. was formed by the merging of the following companies in 1972:

- Delta Mud & Chemical Company Inc.
- Gem Oil Tool Co. Inc.
- Intercoastal Drilling Inc.
- Delta Safety & Supply Co. Inc.
- Petroleum Treaters Inc.
- Arnold & Clark Chemical Company, Inc.

The entire property consisted of 165 acres and was home to seven divisions of Delta Ironworks, including Delta Shipyard. In 1973, Delta Ironworks was merged into Chromalloy American Corporation of St. Louis, Missouri. Chromalloy maintained all seven of the divisions until November 1980, when five of the divisions were sold to Delta Services Industries of Houma, Louisiana including Delta Shipyard. Mr. Lynn Dean (of Dean Boats, Inc.) purchased 110 acres of the industrial park from Delta Services in 1986 including the property owned by Delta Shipyard.

Delta Shipyard consisted of a cleaning and repair facility for small cargo boats, fishing boats, and oil barges. Before repair work could begin, the boats had to be certified vapor free by the U.S. Coast Guard. In order to accomplish this, the boats were first steam cleaned to remove oily

wastes. Recovered oil that was still deemed usable was recovered and sold. Oily waste from the cleaning process was stored in several unlined earthen pits used as evaporation ponds. These pits were reportedly also used to dispose of oil field drilling material.

Currently, there are three evaporation pits located on-site. During a site reconnaissance conducted 10 January 2012, the three pits were observed to be uncovered and their contents exposed to the elements. The pits have no vegetation growing on them and have a crusty layer on the surface. The crusty layer on the pits is black and appears to be a dried oil/petroleum-type waste. The earthen berms are not maintained, contain heavy vegetation, and do not appear to have sufficient head space to contain the contents of the pits in a rain event. A second site reconnaissance was conducted on 7 June 2012, the area around the pits was observed to be overgrown with vegetation. The three pits were exposed to the elements as stated above; however, some grass and other native vegetation were observed growing within the pits. Based on a review of historical documents, there was a fourth pit located west of Dean Court; as previously stated, the area associated with Pit 4 is currently an open field overgrown with grass. No evidence of the additional fourth pit was observed during the two site reconnaissances.

## **2.3 PREVIOUS INVESTIGATIONS**

In 1985, Wink Engineering collected sludge samples from the on-site pits for LDEQ. The samples were analyzed for volatile organics, cyanide, total phenol, flash point, pH, toxicity, and oil and grease. Based on the analytical results, the 1985 Wink report concluded that the site did not pose a threat to human health or the environment.

In December 1994, WESTON completed a Site Inspection Prioritization (SIP) for EPA Region 6 under the Alternative Remedial Contracting (ARCS). Three pit sludge and four drainage ditch sediment samples were collected. The analytical results revealed the presence of elevated concentrations of several PAH semivolatile organic compounds and metals. In December 1996, WESTON completed an Expanded Site Inspection Report under the ARCS contract. Over 60 samples were collected to document the presence and evaluate the extent of migration of hazardous substances associated with the Delta Shipyard site. The analytical results showed elevated levels of VOCs, PAHs, and metals in the on-site pits and evidence of off-site migration.

## **2.4 SITE CONCERNS**

The primary concern at the Delta Shipyard site is the presence of metals and SVOCs including benzo(a)pyrene. The contamination appears to be the result of past industrial practices associated with the Delta Shipyard cleaning and repair activities. Chemical analysis of surface soils collected from the site indicates the presence of 2-methylnaphthalene, naphthalene, phenanthrene, total xylenes, chromium, arsenic, and barium in concentrations exceeding three times background. The site is situated in an industrial area of Houma, Louisiana. The owner of EBI lives on-site. The site is not fenced nor is there any security; thus, the site and contaminated waste and soil at the site are accessible to the general public.

### **3. SAMPLING APPROACH AND PROCEDURES**

The specific field investigation activities that will be conducted during site sampling are presented in the following subsections. Sampling activities will be conducted in support of two separate mission requirements: 1) Site Assessment documentation and 2) Removal Assessment documentation. The sampling approach for each mission is different and therefore will be addressed separately in the following subsections. Samples collected as part of this SR will be obtained in accordance with EPA *Contract Laboratory Program Guidance for Field Samplers*, EPA540-R-00-003, OSWER 9240.0-35 (Appendix A). START-3 will use EPA Scribe Environmental Sampling Data Management System (SCRIBE) software to manage sample data.

#### **3.1 OVERVIEW OF SAMPLING ACTIVITIES**

EPA and START-3 developed sampling strategies intended to collect data necessary to evaluate and meet the objective of both the Site Assessment and the Removal Assessment. Data quality objectives as well as an overview of the health and safety and field activities required to complete these tasks are presented in the following subsections.

##### **3.1.1 Site Assessment**

In support of the Site Assessment, this SR is being performed to evaluate the surface water exposure pathway at or near the Delta Shipyard site. The EPA SAM and START-3 will collect 16 surface water samples and/or sediment samples from Company Canal, Bayou La Carpe, and the Houma Navigation Canal (including seven background and one Quality Assurance/Quality Control [QA/QC]). START-3 will also collect 3 waste samples from the visible pits (one from each pit) and 2 soil samples from where historical pits were located on the west side of the property. In addition, 11 soil/sediment (including 1 duplicate) samples will be collected from the overland flow pathway between the source and the probable point of entry into the surface water pathway.

### **3.1.2 Removal Assessment**

In support of the Removal Assessment, this SR is being performed to characterize the waste material within the on-site pits and to determine the horizontal and vertical extent of on-site contamination. The EPA OSC and START-3 will collect source characterization core samples from each of the three on-site pits. Core samples will be collected from five points within each pit. Up to five samples per core, selected by the START-3 FTL (based on visual observation), will be collected for analytical testing. In addition, surface and subsurface soil samples will be collected from 12 locations outside the perimeter of the impoundment berms to assess the vertical and horizontal extent of contamination. Up to four samples per location, selected by START-3 FTL (based on visual observation), will be collected for analytical testing.

### **3.1.3 Data Quality Objectives**

The objectives of the Site Assessment sampling activities described in this QASP are to reassess known or suspected hazardous waste source areas and to obtain updated analytical data documenting a release of site-related hazardous substances and contaminants into the surface water pathway. To accomplish this, the following data quality objectives (DQOs) have been established and are included in Appendix B:

- Characterize the source(s) and areas of observed contamination.
- Reassess if there is a release of site-related contamination in the surface water pathway.

The DQOs were developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*. Table 3-1 summarizes the Site Assessment sample locations and the rationale for their collection.

The objectives of the Removal Assessment sampling activities described in this QASP are to characterize the suspected hazardous waste source areas and obtain analytical data documenting the horizontal and vertical extent of contamination. To accomplish this, the following data quality objectives (DQOs) have been established and are also included in Appendix B:

- Characterize the waste material located within the on-site pits.
- Assess the vertical and horizontal extent of contamination associated with the on-site pits.

The DQOs were developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

#### **3.1.4 Health and Safety Plan Implementation**

The START-3 field activities will be conducted in accordance with the site-specific health and safety plan (HASP). The FSO will be responsible for implementation of the HASP during all field investigation activities. The HASP specifies that soil, sediment, and waste sampling will proceed in modified Level D PPE (coveralls, safety glasses, disposable gloves, and steel-toed boots). The PTL will act as the Field Safety Officer (FSO) and will be responsible for implementation of the HASP during field investigation activities. The START-3 field team will be required to conduct work according to the guidelines and requirements of the HASP. In accordance with the WESTON general health and safety operating procedures, the field team will also drive the route to the hospital specified in the HASP prior to initiating sampling activities.

#### **3.1.5 Community Relations**

Community relations may require additional EPA involvement due to the general nature of the site. Community relations issues will be directed to the EPA OSC. If the EPA OSC is not present, the START-3 PTLs, under the guidance of the START-3 Scope of Work Leader, will manage community relations in the field as directed by the OSC. If a community relations plan and implementation program becomes necessary, START-3 will establish each if requested by the EPA OSC. START-3 will work as directed by the EPA OSC to obtain access to designated sampling locations.

### **3.2 SAMPLING/MONITORING APPROACH**

Water, soil, sediment, and source samples will be collected in general accordance with the EPA *Compendium of Emergency Response Team (ERT) Soil Sampling Surface Geophysics Procedures* and the WESTON Standard Operating Procedures (SOPs) included in Appendix C. WESTON Standard Operating Procedures (SOPs) include SOP No. 1002-01 for Surface Water Sample Collection and SOP No. 1002-04 for Sediment Sampling (Appendix C). Source samples

will be collected using 1001-01, 1001-04, and 1001-10 (Surface Soil Sampling, Stockpile Sampling, and Composite Sampling). The specific sampling procedures are described below.

### **3.2.1 Waste Characterization Sampling**

In support of both the Site and Removal Assessment activities, five core samples will be collected from each of the open pits (Pits 1, 2, and 3). The exact locations of the samples will be decided by the EPA SAM/OSC and START-3 PTL. START-3 will utilize a Swamp Master all-terrain vehicle to provide access and collect pit core samples for laboratory analysis. Core samples will be collected until a depth of refusal or groundwater is encountered. Up to five samples per core, selected by START-3 FTL, based on visual observation will be collected for analytical testing. The pit cores will be advanced to an estimated depth of 8 feet below ground surface (bgs) using poly-vinyl chloride piping with a core catcher insert. The exact locations of the samples within each pit will be decided in the field by the EPA OSC and START-3 PTL. Composite core samples will be collected at depths of 0 to 12 inches, 1 to 2 feet, 2 to 4 feet, 4 to 6 feet, and 6 to 8 feet if conditions allow.

The proposed Site and Removal Assessment source waste sample and soil sample locations are presented in Figure 3-1. Deviations from the sample locations will be due to new observations made prior to sampling, information obtained in the field that warrants an altered sampling point, difficulty in sample collection, or limited access. The EPA OSC will be notified, and concurrence will be obtained should significant deviations from the planned sampling points be proposed. Details regarding deviations of the QASP will be documented in the site logbook. Table 3-1 summarizes the Site Assessment sample locations and the rational for their collection. Table 3-2 summarizes the Removal Assessment sample locations and the rational for their collection.

The waste samples will be submitted to a NELAP certified laboratory for analyses as outlined in Section 4.0.

A 5-gallon waste sample will also be collected from each of the three pits for treatability analysis. These samples will not be submitted for analysis until the initial analytical data is

reviewed. Once the data is reviewed, the EPA OSC, with technical assistance from START-3, will determine the parameters of the treatability analyses.

### **3.2.2 Surface Water Pathway Sampling**

This sampling activity is in support of Site Assessment documentation only. START-3 will collect 16 co-located surface water and sediment samples (including seven background and one duplicate sample) as part of the SR to document a release to the surface water pathway from the site. The surface water samples will be collected by submerging the sample container into the water and facing the mouth of the container upstream while sampling personnel stand downstream. The sediment samples will be collected concurrently with the surface water samples and will be grab samples at 0 to 2 inches below ground surface utilizing disposable plastic scoops. The proposed surface water and sediment sample locations are presented in Figure 3-2. Surface water and sediment samples will be submitted to a NELAP certified laboratory as outlined in Section 4.0.

### **3.2.3 Soil Sampling**

In support of both the Site and Removal Assessment activities, START-3 will collect up to 75 surface/subsurface soil samples (including three duplicate samples) as part of the SR to assess the surface water pathway and document the vertical and horizontal extent of contamination. The proposed soil sample locations are presented in Figure 3-1.

START-3 will collect 12 (including one duplicate) of these samples from the overland flow pathway or drainage ditches from the sources to the surface water. These samples will be grab samples collected from the surface using disposable plastic scoops.

For the remaining samples, START-3 will utilize a Geoprobe<sup>®</sup> subsurface coring device to collect subsurface grab soil samples along the outer edge of the earthen pit containment berms. Geoprobe<sup>®</sup> samples will be collected until a depth of refusal or groundwater is encountered. Up to five samples per location, selected by the START-3 PTL (based on visual observation), will be collected for analytical testing. The Geoprobe<sup>®</sup> cores will be advanced to an estimated depth of 8 feet bgs. The exact locations of the extent of contamination samples will be decided in the

field by the EPA OSC and START-3 FTL. It is estimated that extent of contamination soil samples will be collected at depths of 0 to 12 inches, 1 to 2 feet, 2 to 4 feet, 4 to 6 feet, and 6 to 8 feet if conditions allow.

Deviations from the sample locations will be due to new observations made prior to sampling, information obtained in the field that warrants an altered sampling point, difficulty in sample collection, or limited access. The EPA OSC will be notified, and concurrence will be obtained should significant deviations from the planned sampling points be proposed. Details regarding deviations of the QASP will be documented in the site logbook. Soil samples will be submitted to a NELAP certified laboratory as outlined in Section 4.0. TCLP analyses will not be conducted on extent of contamination soil samples.

#### **3.2.4 Investigation-Derived Wastes**

Attempts will be made to eliminate or minimize generation of IDW during this investigation. Excess soil from sample locations will be placed back in the sample holes. All non-dedicated equipment will be decontaminated according to WESTON SOP 1201.01. Non-dedicated equipment will be rinsed with soap and water, and excess fluids generated as a result of equipment decontamination will be stored on-site or will be disposed of upon completion of the removal assessment. The analytical data from collected samples will be reviewed after completion of the field activities, and disposal options will be evaluated accordingly. It is anticipated that minimal amounts of IDW will be generated during this activity.

#### **3.2.5 Sample Handling Procedures**

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. The volume of the sample collected must be sufficient to perform the laboratory analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate to the analysis to be performed. A sample collection and analyses summary table is presented in Section 4.

All clean, decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. All samples will be collected with clean decontaminated equipment

following WESTON SOP 1201.01. All samples collected for laboratory analysis will be placed directly into pre-cleaned, unused glass or plastic containers. Sampling personnel will change gloves between each sample collection/handling. All samples will be assembled and catalogued prior to shipping to the designated laboratory (following WESTON SOP 1101.1 and 1102.01).

### **3.2.6 Quality Assurance/Quality Control Samples**

START-3 will collect field duplicates and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples of surface water, soil, and sediment samples, as well as prepare equipment rinsate blank samples as needed during the assessment sampling activities. QA/QC samples will be collected according to the following:

- Blind field duplicate samples will be collected during sampling activities at locations selected by the START-3 PTL. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Efforts will be made to collect duplicate samples in locations where there is visual evidence of contamination or where contamination is suspected. Blind field duplicate samples will be collected at the rate of one duplicate for every 10 samples collected.
- A trip blank will accompany each sampling cooler with VOC samples and will be provided by the designated laboratory. The trip blank will be used to evaluate the presence of cross-contamination of the environmental samples. The trip blank will be analyzed for VOCs.
- Equipment rinsate blanks will be prepared by pouring laboratory-grade deionized water over nondisposable sampling equipment after it has been decontaminated and collecting the rinse water in sample containers for analyses. These samples will be prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed effectively. The equipment rinsate blanks will be prepared each day that non-disposable sampling equipment is used.
- Temperature blanks will be prepared in the field and will consist of one 40-milliliter glass sample container with Teflon-lined septum cap. The temperature blank will be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of these samples within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.
- If necessary, field blanks will be collected when VOC samples are taken and are analyzed only for VOC analytes. The field blank consists of American Society of Testing and Materials (ASTM) Type II reagent-grade water poured into a VOC sample vial at the sampling site. It is handled like an environmental sample and transported to the

laboratory for analysis. Field blanks are used to assess the potential introduction of contaminants from ambient sources (e.g., gasoline motors in operation, etc.) to the samples during sample collection. It is anticipated that no field blanks will be collected as part of this sampling activity.

- MS/MSD samples will be collected during sampling activities at locations selected by the START-3 PTL. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Efforts will be made to collect MS/MSD samples in locations where there is no visual evidence of contamination or where contamination is not suspected. MS/MSD samples will be collected at the rate of one MS/MSD sample per matrix for every 20 samples collected.

### **3.3 SAMPLE MANAGEMENT**

Specific nomenclature that will be used by START-3 will provide a consistent means of facilitating the sampling and overall data management for the project (WESTON SOP 0110.05). The START-3 Assessment/Inspection Manager must approve any deviations from the sample nomenclature proposed below.

As stated in WESTON SOP 0110.05, sample nomenclature will follow a general format regardless of the type or location of the sample collected. The general nomenclature consists of the following components:

- Geographic location (e.g., location within a surface water body or monitoring well).
- Collection type (composite, grab, etc.).
- QA/QC type (normal, duplicate, etc.).
- Sequence and/or Depth - An additional parameter used to further differentiate samples.

Sample data management will be completed utilizing SCRIBE including Chain-of-Custody (COC) and sample documentation needs.

### **3.4 DECONTAMINATION**

The nondisposable sampling equipment (hand trowels, stainless steel bowls, etc.) used during the sample collection process will be thoroughly decontaminated before initial use, between use, and at the end of the field investigation. Equipment decontamination will be completed in the following steps:

- Water spray or brush, if needed, to remove soil/sediment from the equipment.
- Nonphosphate detergent and potable water wash to clean the equipment.
- Final potable water rinse.
- Air-dried equipment.

Personnel decontamination procedures are described in the site-specific HASP. All decontamination activities will be conducted at a temporary decontamination pad that will be constructed in an area to be determined by the PTL prior to the beginning of field activities.

Excess soil and fluids generated as a result of equipment decontamination will be placed in a drum and staged in an area to be determined by the PTL. The drum will be labelled on the side with the name of the site, the contents, sampling location, and date.

### **3.5 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES**

Once collected, samples will be stored in coolers and kept at approximately 4° C while at the site and until they are submitted for analysis. Chain-of-custody forms will be completed for each sample shipment and sent with the samples to the designated laboratory by overnight carrier. Samples that have been analyzed will be disposed of by the designated laboratory in accordance with the laboratory SOPs.

**Table 3-1**  
**Site Assessment Sample Locations and Sampling Rationale**  
**Delta Shipyard Site**  
**Houma, Terrebonne Parish, Louisiana**

Sample Name	Sample Matrix	Sample Location (refer to Figures 3-1& 3-2)	Rationale
BLC-01-00-111 BLC-01-03-611	Surface water Sediment	Bayou La Carpe mid-point between the Intracoastal Waterway and Houma Navigation Canal	Collected to establish background concentration in Bayou La Carpe
BLC-02-00-111 BLC-02-03-611	Surface water Sediment	Bayou La Carpe right before confluence with Houma Navigation Canal	Collected to establish background concentration in Bayou La Carpe
HNC-01-00-111 HNC-01-03-611	Surface water Sediment	Houma Navigation Canal mid-point between the Intracoastal Waterway and confluence with Bayou La Carpe	Collected to establish background concentration in Houma Navigation Canal
HNC-02-00-111 HNC-02-03-611	Surface water Sediment	Houma Navigation Canal right before confluence with Bayou La Carpe	Collected to establish background concentration in Houma Navigation Canal
CC-01-00-111 CC-01-03-611	Surface water Sediment	Company Canal upstream of the Site	Collected to establish background concentration in Company Canal
MPC-01-00-111 MPC-01-03-611	Surface water Sediment	Main Port Canal upstream of the convergence with Bayou La Carpe	Collected to establish background concentration in Main Port Canal
DC-01-00-111 DC-01-00-111	Surface water Sediment	Dickson Canal upstream of the convergence with Houma Navigation Canal	Collected to establish background concentration in Dickson Canal
CC-02-00-112 CC-02-03-612 CC-02-00-122 CC-02-03-622	Surface water Sediment	Within Company Canal at the Probable Point of Entry	To establish Observed Release into surface water pathway
CC-03-00-112 CC-03-03-612	Surface water Sediment	Within Company Canal	To establish Observed Release into surface water pathway
CC-04-00-112 CC-04-03-612	Surface water Sediment	Within Company Canal	To establish Observed Release into surface water pathway
BLC-03-00-112 BLC-03-03-612	Surface water Sediment	Within Bayou La Carpe	To establish Observed Release into surface water pathway
BLC-04-00-112 BLC-04-03-612	Surface water Sediment	Within Bayou La Carpe	To establish Observed Release into surface water pathway
HNC-03-00-112 HNC-03-03-612 HNC-03-00-122 HNC-03-03-622	Surface water Sediment	Within Houma Navigation Canal	To establish Observed Release into surface water pathway
HNC-04-00-112 HNC-04-03-612	Surface water Sediment	Within Houma Navigation Canal	To establish Observed Release into surface water pathway
HNC-05-00-112 HNC-05-03-612	Surface water Sediment	Within Houma Navigation Canal	To establish Observed Release into surface water pathway
DSE-01-12-413	Solid Waste	From Pit 1	Source Characterization – these will be the same samples as those collected for the removal assessment at 0-12 inches
DSE-02-12-413	Solid Waste	From Pit 2	Source Characterization – these will be the same samples as those collected for the removal assessment at 0-12 inches
DSE-03-12-413	Solid Waste	From Pit 3	Source Characterization – these will be the same samples as those collected for the removal assessment at 0-12 inches

**Table 3-1**  
**Site Assessment Sample Locations and Sampling Rationale**  
**Delta Shipyard Site**  
**Houma, Terrebonne Parish, Louisiana**  
**(Continued)**

<b>Sample Name</b>	<b>Sample Matrix</b>	<b>Sample Location (refer to Figures 3-1&amp; 3-2)</b>	<b>Rationale</b>
DSW-01-01-513	Soil	From historical pit location	Potential source identification/characterization
DSW-02-01-513	Soil	From historical pit location	Potential source identification/characterization
DSE-05-01-514 DSE-05-01-524	Soil	North of Pit 1	To establish attribution through overland flow migration
DSE-07-01-514	Soil	West of Pit 1 within drainage ditch	To establish attribution through overland flow migration
DSE-10-01-514	Soil	West of Pit 2 within drainage ditch	To establish attribution through overland flow migration
DSE-13-01-514	Soil	West of Pit 3 within drainage ditch	To establish attribution through overland flow migration
DSE-16-01-514	Soil	South of Pit 3 within area of dams and weirs	To establish attribution through overland flow migration
DSE-17-01-514	Soil	South of Pit 3 within area of dams and weirs	To establish attribution through overland flow migration
DSE-18-01-514 DSE-18-01-524	Soil	Southeast of Pits before entry into Company Canal	To establish attribution through overland flow migration
DSE-09-01-514	Soil	East of Pit 1 along Company Canal	To establish attribution through overland flow migration
DSE-12-01-514	Soil	East Pit 2 along Company Canal	To establish attribution through overland flow migration
DSE-15-01-514	Soil	East Pit 3 along Company Canal	To establish attribution through overland flow migration

**Table 3-2**  
**Removal Assessment Sample Locations and Sampling Rationale**  
**Delta Shipyard Site**  
**Houma, Terrebonne Parish, Louisiana**

Sample Name	Sample Matrix	Sample Location (refer to Figures 3-1& 3-2)	Rationale
DSE-01-12-413	Solid Waste	From Pit 1	Source Characterization (0 to 12 inches)
DSE-01-24-413	Solid Waste	From Pit 1	Source Characterization (1 to 2 feet)
DSE-01-48-413	Solid Waste	From Pit 1	Source Characterization (2 to 4 feet)
DSE-01-72-413	Solid Waste	From Pit 1	Source Characterization (4 to 6 feet)
DSE-01-96-413	Solid Waste	From Pit 1	Source Characterization (6 to 8 feet)
DSE-02-12-413	Solid Waste	From Pit 2	Source Characterization (0 to 12 inches)
DSE-02-24-413	Solid Waste	From Pit 2	Source Characterization (1 to 2 feet)
DSE-02-48-413	Solid Waste	From Pit 2	Source Characterization (2 to 4 feet)
DSE-02-72-413	Solid Waste	From Pit 2	Source Characterization (4 to 6 feet)
DSE-02-96-413	Solid Waste	From Pit 2	Source Characterization (6 to 8 feet)
DSE-03-12-413	Solid Waste	From Pit 3	Source Characterization (0 to 12 inches)
DSE-03-24-413	Solid Waste	From Pit 3	Source Characterization (1 to 2 feet)
DSE-03-48-413	Solid Waste	From Pit 3	Source Characterization (2 to 4 feet)
DSE-03-72-413	Solid Waste	From Pit 3	Source Characterization (4 to 6 feet)
DSE-03-96-413	Solid Waste	From Pit 3	Source Characterization (6 to 8 feet)
DSE-04-12-515	Soil	Northwest of Pit 1	Extent of Contamination (0 to 12 inches)
DSE-04-24-515	Soil	Northwest of Pit 1	Extent of Contamination (1 to 2 feet)
DSE-04-48-515	Soil	Northwest of Pit 1	Extent of Contamination (2 to 4 feet)
DSE-04-72-515	Soil	Northwest of Pit 1	Extent of Contamination (4 to 6 feet)
DSE-04-96-515	Soil	Northwest of Pit 1	Extent of Contamination (6 to 8 feet)
DSE-05-12-515	Soil	North of Pit 1	Extent of Contamination (0 to 12 inches)
DSE-05-24-515	Soil	North of Pit 1	Extent of Contamination (1 to 2 feet)
DSE-05-48-515	Soil	North of Pit 1	Extent of Contamination (2 to 4 feet)
DSE-05-72-515	Soil	North of Pit 1	Extent of Contamination (4 to 6 feet)
DSE-05-96-515	Soil	North of Pit 1	Extent of Contamination (6 to 8 feet)
DSE-06-12-515	Soil	Northeast of Pit 1	Extent of Contamination (0 to 12 inches)
DSE-06-24-515	Soil	Northeast of Pit 1	Extent of Contamination (1 to 2 feet)
DSE-06-48-515	Soil	Northeast of Pit 1	Extent of Contamination (2 to 4 feet)
DSE-06-72-515	Soil	Northeast of Pit 1	Extent of Contamination (4 to 6 feet)
DSE-06-96-515	Soil	Northeast of Pit 1	Extent of Contamination (6 to 8 feet)
DSE-07-12-515	Soil	West of Pit 1	Extent of Contamination (0 to 12 inches)
DSE-07-24-515	Soil	West of Pit 1	Extent of Contamination (1 to 2 feet)
DSE-07-48-515	Soil	West of Pit 1	Extent of Contamination (2 to 4 feet)
DSE-07-72-515	Soil	West of Pit 1	Extent of Contamination (4 to 6 feet)
DSE-07-96-515	Soil	West of Pit 1	Extent of Contamination (6 to 8 feet)
DSE-08-12-515	Soil	East of Pit 1	Extent of Contamination (0 to 12 inches)
DSE-08-24-515	Soil	East of Pit 1	Extent of Contamination (1 to 2 feet)
DSE-08-48-515	Soil	East of Pit 1	Extent of Contamination (2 to 4 feet)
DSE-08-72-515	Soil	East of Pit 1	Extent of Contamination (4 to 6 feet)
DSE-08-96-515	Soil	East of Pit 1	Extent of Contamination (6 to 8 feet)
DSE-10-12-515	Soil	West of Pit 2	Extent of Contamination (0 to 12 inches)
DSE-10-24-515	Soil	West of Pit 2	Extent of Contamination (1 to 2 feet)
DSE-10-48-515	Soil	West of Pit 2	Extent of Contamination (2 to 4 feet)
DSE-10-72-515	Soil	West of Pit 2	Extent of Contamination (4 to 6 feet)
DSE-10-96-515	Soil	West of Pit 2	Extent of Contamination (6 to 8 feet)
DSE-11-12-515	Soil	East of Pit 2	Extent of Contamination (0 to 12 inches)
DSE-11-24-515	Soil	East of Pit 2	Extent of Contamination (1 to 2 feet)
DSE-11-48-515	Soil	East of Pit 2	Extent of Contamination (2 to 4 feet)

**Table 3-2**  
**Removal Assessment Sample Locations and Sampling Rationale**  
**Delta Shipyard Site**  
**Houma, Terrebonne Parish, Louisiana**  
**(Continued)**

Sample Name	Sample Matrix	Sample Location (refer to Figures 3-1& 3-2)	Rationale
DSE-11-72-515	Soil	East of Pit 2	Extent of Contamination (4 to 6 feet)
DSE-11-96-515	Soil	East of Pit 2	Extent of Contamination (6 to 8 feet)
DSE-13-12-515	Soil	West of Pit 3	Extent of Contamination (0 to 12 inches)
DSE-13-24-515	Soil	West of Pit 3	Extent of Contamination (1 to 2 feet)
DSE-13-48-515	Soil	West of Pit 3	Extent of Contamination (2 to 4 feet)
DSE-13-72-515	Soil	West of Pit 3	Extent of Contamination (4 to 6 feet)
DSE-13-96-515	Soil	West of Pit 3	Extent of Contamination (6 to 8 feet)
DSE-14-12-515	Soil	East of Pit 3	Extent of Contamination (0 to 12 inches)
DSE-14-24-515	Soil	East of Pit 3	Extent of Contamination (1 to 2 feet)
DSE-14-48-515	Soil	East of Pit 3	Extent of Contamination (2 to 4 feet)
DSE-14-72-515	Soil	East of Pit 3	Extent of Contamination (4 to 6 feet)
DSE-14-96-515	Soil	East of Pit 3	Extent of Contamination (6 to 8 feet)
DSE-16-12-515	Soil	Southwest of Pit 3	Extent of Contamination (0 to 12 inches)
DSE-16-24-515	Soil	Southwest of Pit 3	Extent of Contamination (1 to 2 feet)
DSE-16-48-515	Soil	Southwest of Pit 3	Extent of Contamination (2 to 4 feet)
DSE-16-72-515	Soil	Southwest of Pit 3	Extent of Contamination (4 to 6 feet)
DSE-16-96-515	Soil	Southwest of Pit 3	Extent of Contamination (6 to 8 feet)
DSE-17-12-515	Soil	South of Pit 3	Extent of Contamination (0 to 12 inches)
DSE-17-24-515	Soil	South of Pit 3	Extent of Contamination (1 to 2 feet)
DSE-17-48-515	Soil	South of Pit 3	Extent of Contamination (2 to 4 feet)
DSE-17-72-515	Soil	South of Pit 3	Extent of Contamination (4 to 6 feet)
DSE-17-96-515	Soil	South of Pit 3	Extent of Contamination (6 to 8 feet)
DSE-18-12-515	Soil	Southwest of Pit 3	Extent of Contamination (0 to 12 inches)
DSE-18-24-515	Soil	Southwest of Pit 3	Extent of Contamination (1 to 2 feet)
DSE-18-48-515	Soil	Southwest of Pit 3	Extent of Contamination (2 to 4 feet)
DSE-18-72-515	Soil	Southwest of Pit 3	Extent of Contamination (4 to 6 feet)
DSE-18-96-515	Soil	Southwest of Pit 3	Extent of Contamination (6 to 8 feet)

## **4. ANALYTICAL METHODS**

### **Waste Samples**

START-3 will submit the waste samples to a NELAP certified laboratory, for the following analyses:

- Total Compound List (TCL) Volatiles Organic Compounds (VOC) by SW846 Method 8260B.
- TCL Semivolatile Organic Compounds (SVOCs) by SW386 Method 8270C.
- Organochlorine Pesticides (Pesticides) by SW846 Method 8081B.
- Polychlorinated Biphenyls (PCBs) by SW846 Method 8082A.
- Chlorinated Herbicides (Herbicides) by SW846 Method 8151A.
- Total Analyte List (TAL) metals including mercury by SW846 Methods 6010B and 7470/7471, respectively.
- Toxicity Characteristic Leachate Procedure (TCLP) Total Volatiles Organic Compounds (VOC) by SW846 Method 1311/8260B.
- TCLP Semivolatile Organic Compounds (SVOCs) by SW386 Method 1311/8270C.
- TCLP Metals including mercury by SW846 Methods 1311/6010B and 1311/7470/7471, respectively.

### **Soil, Sediment, and Surface Water Samples**

Soil, sediment and surface water samples will be submitted to a NELAP certified laboratory for the following analyses:

- TCL VOCs by SW846 Method 8260B.
- TCL SVOCs by SW386 Method 8270C.
- Pesticides by SW846 Method 8081B.
- PCBs by SW846 Method 8082A.
- Herbicides by SW846 Method 8151A.
- TAL metals including mercury by SW846 Methods 6010B and 7470/7471, respectively.

Laboratory-specific analyte lists and reporting limits are included in Appendix D. Tables 4-1 and 4-2 summarize the samples that will be collected, including the volumes, container types, and associated analytical methods.

**Table 4-1**  
**Requirements for Containers, Preservation Techniques,**  
**Sample Volumes, and Holding Times**  
**Delta Shipyard**  
**Houma, Terrebonne Parish, Louisiana**

<b>Name</b>	<b>Analytical Methods</b>	<b>Matrix</b>	<b>Container</b>	<b>Preservation</b>	<b>Minimum Volume or Weight</b>	<b>Maximum Holding Time</b>
TCL VOCs (Including TCLP?)	SW846 8260B	Water / Solid	Glass, (Teflon- lined septum for water)	4°C, HCl to pH<2 (pH adjust for water only)	3 x 40 mL vials (water), 8 oz (solid)	14 days (7 days if unpreserved by acid for water)
TCL SVOCs (Including TCLP?)	SW846 8270C	Water / Solid	Amber Glass, (Teflon- lined for water)	4°C	2 x 1 liter (water), 8 oz (solid)	7 days extract (water), 14 days (solid)/ 40 days analysis
TAL Metals and Mercury (Including TCLP?)	SW846 6010B and SW846 7470/7471A	Water / Solid	Polyethylene (water), Glass (solid)	HNO <sub>3</sub> to pH<2 (water), 4°C	500 mL, 8oz (solid-combined w/SVOCs)	28 days for mercury 180 days all other metals
Pesticides	SW846 8081B	Water / Solid	Amber Glass, (Teflon- lined for water)	4°C	2 x 1 liter (water), 8 oz (solid)	7 days extract (water), 14 days (solid)/ 40 days analysis
PCBs	SW846 8082A	Water / Solid	Amber Glass, (Teflon- lined for water)	4°C	1 x 1 liter (water), 8 oz (solid-combined w/SVOCs)	7 days extract (water), 14 days (solid)/ 40 days analysis
Herbicides	SW846 8151A	Water / Solid	Amber Glass, (Teflon- lined for water)	4°C	1 x 1 liter (water), 8 oz (solid-combined w/SVOCs)	7 days extract (water), 14 days (solid)/ 40 days analysis

**Table 4-2**  
**Field and Laboratory QA/QC and Analysis Summary**  
**Delta Shipyard**  
**Houma, Terrebonne Parish, Louisiana**

Sample Type	Sample Collection Method	No. of Samples	Rationale	EPA Analytical Method
Surface Water	SOP 2013/1002.1	8	Extent of contamination within Company Canal, Bayou La Carpe, and Houma Navigation Canal	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7470
Surface Water	SOP 2013/1002.1	7	Background samples from Company Canal, Bayou La Carpe, Intracoastal Waterway, and Houma Navigation Canal	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7470
Duplicate Surface Water (10%)	SOP 1005.01	2	QA/QC	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7470
Sediment	SOP 2016/1002.4	8	Extent of contamination within Company Canal and Houma Navigation Canal	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7471
Sediment	SOP 2016/1002.4	7	Background samples from Company Canal, Bayou La Carpe, Intracoastal Waterway, and Houma Navigation Canal	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7471
Duplicate Soil/Sediment (10%)	SOP 1005.01	2	QA/QC	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7471
Solid Waste	SOP 2017/1003.02	3	Pits	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7471

**Table 4-2**  
**Field and Laboratory QA/QC and Analysis Summary**  
**Delta Shipyard**  
**Houma, Terrebonne Parish, Louisiana**  
**(Continued)**

Sample Type	Sample Collection Method	No. of Samples	Rationale	EPA Analytical Method
Solid Waste (Removal Assessment)	SOP 2017/1003.02	15	Pits	SW846 1311/8260B, SW846 13/118270C SW846 8081B, SW846 8082A SW846 8151A, SW846 1311/6010B SW-846 1311/7471
Soil	SOP 2012/1001.01	2	Historical buried pits	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7471
Soil (Removal Assessment)	SOP 2012/1001.01	Up to 60	Extent of Contamination	SW846 1311/8260B, SW846 13/118270C SW846 8081B, SW846 8082A SW846 8151A, SW846 1311/6010B SW-846 1311/7471
Soil/Sediment	SOP 2012/1001.01	10	Overland flow – attribution samples	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7471
Trip Blanks	SOP 1005.04	5	QA/QC	SW846 8260B
Rinsate Blanks <sup>1</sup>	SOP 1005.02	5	QA/QC	SW846 8260B, SW846 8270C SW846 8081B, SW846 8082A SW846 8151A, SW846 6010B SW-846 7470
Temperature Blanks <sup>2</sup>	N/A	5	QA/QC	Vial temperature measured upon arrival at laboratory

Note:

<sup>3</sup>Trip blanks will be submitted at a rate of one per cooler per shipment containing samples for VOC analysis.

<sup>2</sup>Rinsate blanks: samples will be collected at the rate of one per day per non-disposable sampling equipment.

<sup>3</sup>Temperature blanks: samples will be submitted at a rate of one per cooler.

## 5. DATA VALIDATION

The analytical data generated by the designated laboratory will be validated using EPA-approved data validation procedures in accordance with the EPA *CLP National Functional Guidelines* for Inorganic Superfund Data Review (January 2010) and Superfund Organic Methods Data Review (June 2008). A summary of the data validation findings will be presented in Data Validation Summary Reports as part of the final report. The following will be evaluated to verify that the analytical data is within acceptable QA/QC tolerances:

- Completeness of the Laboratory Reports, verifying that all required components of the report are present and that the samples indicated on the accompanying chain-of-custody are addressed in the report.
- Calibration and tuning records for the laboratory instruments used for the sample analyses.
- Results of internal standards analyses.
- Results of laboratory blank analyses.
- Results of LCS analyses.
- Results of MS/MSD analyses.
- Compound identification and quantification accuracy.
- Laboratory precision, by reviewing the results for blind field duplicates.

Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

## **6. QUALITY ASSURANCE**

Quality assurance will be conducted in accordance with the WESTON Corporate Quality Management Manual, dated June 2012; the WESTON START-3 Quality Management Plan, dated July 2009; and EPA Quality Assurance/Quality Control Guidance for Removal Activities, dated April 1990. Following receipt of the TDD from EPA, a Quality Control (QC) officer is assigned and monitors work conducted throughout the entire project including reviewing interim report deliverables and field audits. The START-3 PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory utilized during the investigation will be responsible for QA/QC related to the analytical work. START-3 will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received.

### **6.1 SAMPLE CUSTODY PROCEDURES**

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under chain-of-custody (COC) procedures. If the sample collected is to be split (laboratory QC), the sample will be allocated into similar sample containers. Sample labels completed with the same information as that on the original sample container will be attached to each of the split samples. All personnel required to package and ship coolers containing potentially hazardous material will be trained accordingly.

START-3 personnel will prepare and complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to a START-3 designated off-site laboratory. The chain-of-custody procedures are documented and will be made available to all personnel involved with the sampling. A typical chain-of-custody record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and another copy will be retained by the member of the sampling team who

originally relinquished the samples. At the completion of the project, the data manager will export the SCRIBE chain-of-custody documentation to the Analytical Service Tracking System (ANSETS) database.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- Samples will be accompanied by the COC record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody records document transfer of sample custody from the sampler to another person or to the laboratory.
- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.
- If sent by common carrier, a bill of lading or airbill will be used. Bill of lading and airbill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

SOPs 1101.01 and 1102.01 describe these procedures in more detail.

## **6.2 PROJECT DOCUMENTATION**

All documents will be completed legibly in ink and by entry into field logbooks and SCRIBE. Response Manager will be used after direction of the EPA SAM.

### **6.2.1 Field Documentation**

The following field documentation will be maintained as described below.

#### **Field Logbook**

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number.
- Names of personnel on-site.
- Dates and times of all entries.
- Description of all site activities, including site entry and exit times.
- Noteworthy events and discussions.
- Weather conditions.
- Site observations.
- Identification and description of samples and locations.
- Subcontractor information and names of on-site personnel.
- Dates and times of sample collections and chain-of-custody information.
- Records of photographs.
- Site sketches.
- Calibration results.

### **Sample Labels**

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number.
- Date and time the sample was collected.
- Sample preservation method.
- Analysis requested.
- Sampling location.

### **Chain-of-Custody Record**

A chain-of-custody will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for, and a copy of the record will be kept by each individual who has signed it.

### **Custody Seal**

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

### **Photographic Documentation**

START-3 will take photographs to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should

be taken of each type of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions should also be documented as a record of how the site appeared at completion of the work.

All photographs should be taken with either a film camera or digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

### **Response Manager**

Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START-3 field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site Specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry templates from Response Manager to users for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data

entered into EPA SCRIBE software and make it available for multiple users to access on one site. START-3 personnel will utilize SCRIBE for all data entry on-site and will upload to the Response Manager Analytical Module.

START-3 will use the Response Manager module located on the EPA Web Hub, <https://solutions.westonproject.net/epawebhub/>, to compile and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

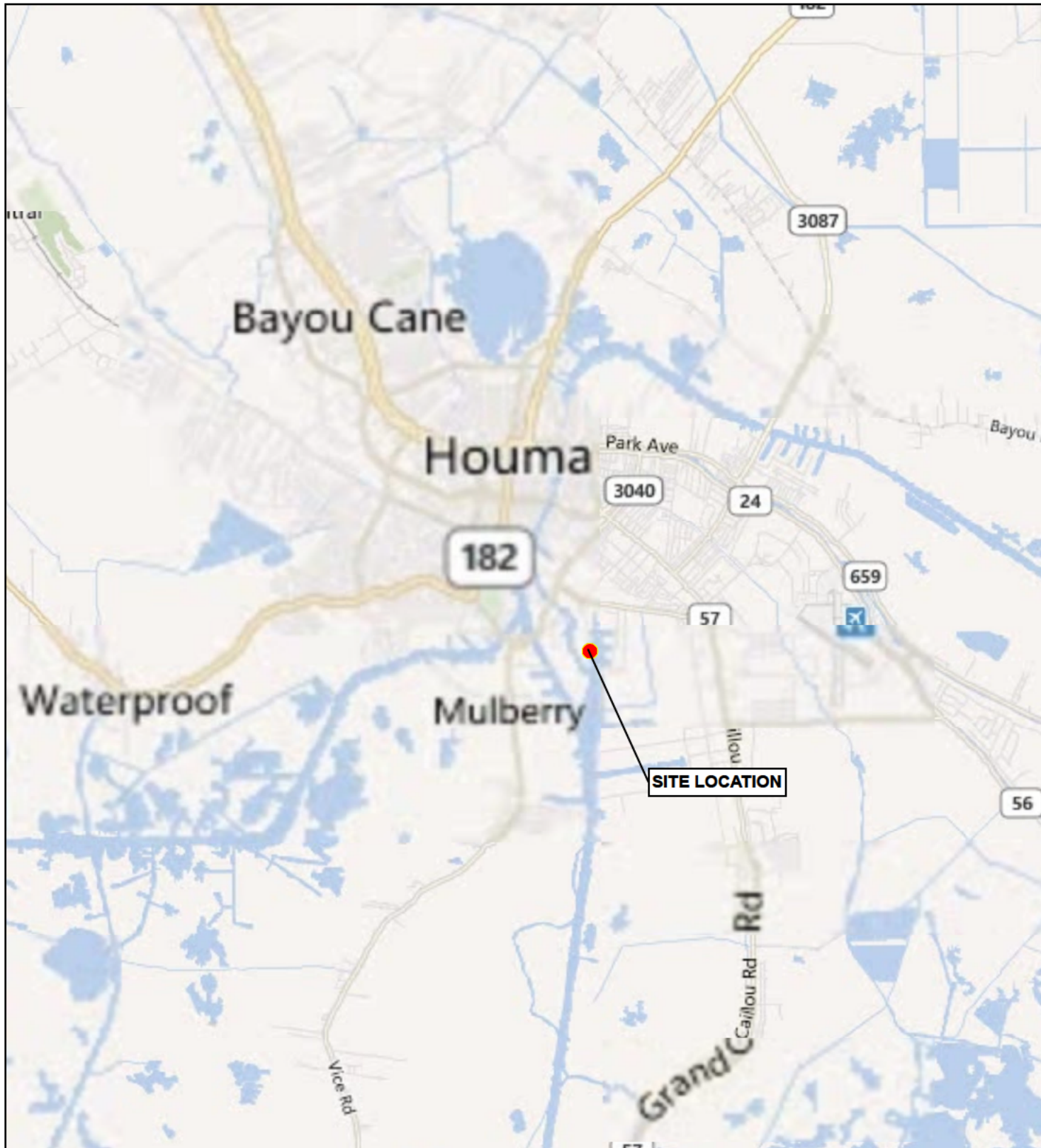
- General Module – site-specific data including location and type of site. It also includes an area for key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Time Line Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for targeted reconnaissance efforts. Typically the data in this module is associated with ESF-10 deployments and the clean-up of orphaned containers and hazardous debris, but the module can be utilized for any or all reconnaissance activities.
- Facility Assessment Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for assessments of structures. Typically utilized for EPA-regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle-to-grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifests and manifest line items and upload photos/original documents to support the records.
- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for tracking which containers are bulked.
- Properties Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for collection of property data including access agreements and assessments of the property and current status of property regarding the site removal action.
- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.

- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the EPA OSC in a POLREP or SITREP.
- HHW Module – provides standard templates with the flexibility of adding any additional questions or values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta-data associated with that data file can be filled in using the photo log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At any time deemed necessary, POLREPs and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and backed up regularly.

### **6.2.2 Report Preparation**

At the completion of the project, START-3 will review and validate all laboratory data and prepare a draft report of field activities and analytical results for EPA SAM review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA SAM review and comment.



0 1.5 3  
SCALE IN MILES

#### LEGEND

● SITE LOCATION



## US EPA REGION 6 START-3

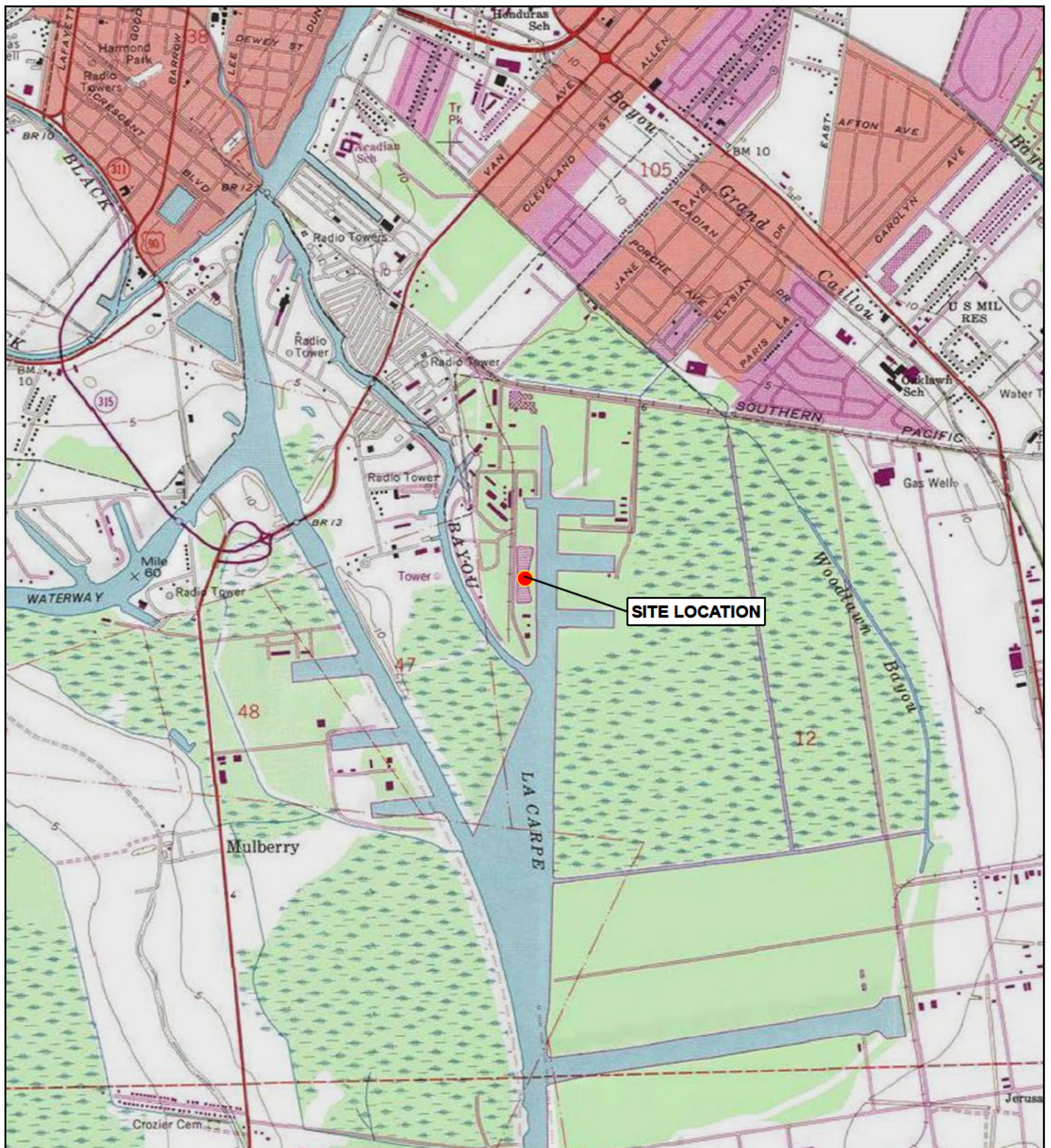
**FIGURE 1-1**  
SITE LOCATION MAP  
DELTA SHIPYARD REASSESSMENT  
200 DEAN COURT, HOUMA  
TERREBONNE PARISH, LOUISIANA

DATE  
JULY, 2012

PROJECT NO  
20406.012-913-000001

SCALE  
AS SHOWN

SOURCE: BING STREET MAPS  
TDD NO: TO-0019-11-10-01  
CERCLIS NO: LAD058475419



0 2,000 4,000  
SCALE IN FEET

#### LEGEND

● SITE LOCATION



## US EPA REGION 6 START-3

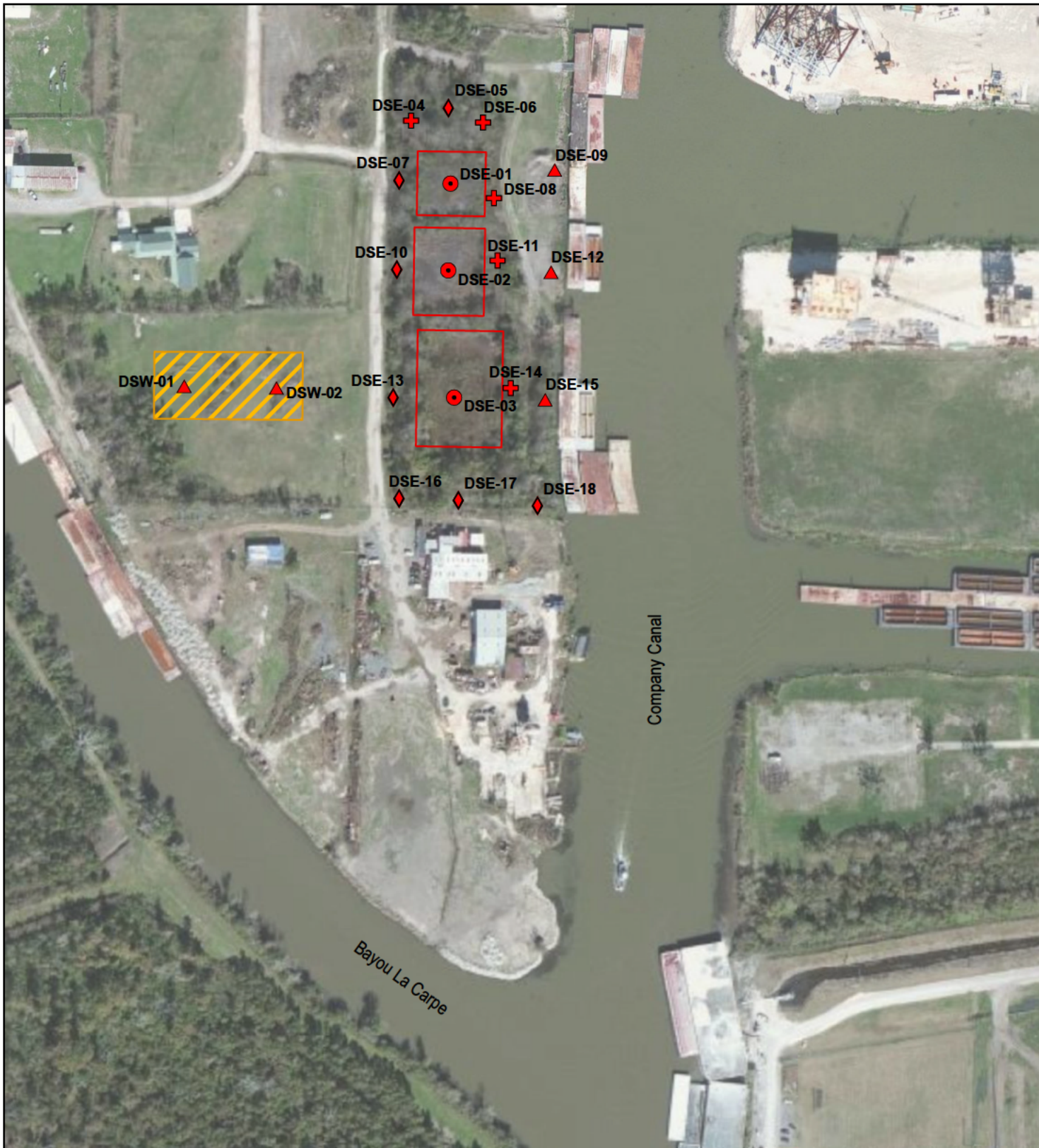
**FIGURE 2-1**  
SITE AREA MAP  
DELTA SHIPYARD REASSESSMENT  
200 DEAN COURT, HOUMA  
TERREBONNE PARISH, LOUISIANA

DATE  
JULY, 2012

PROJECT NO  
20406.012 1600038

SCALE  
AS SHOWN

SOURCE: NATIONAL GEOGRAPHIC TOPO  
TDD NO: TO-0019-11-10-01  
CERCLIS NO: LAD058475419



## Legend

- HRS & REMOVAL ASSESSMENT WASTE SAMPLE LOCATION
- ◆ HRS & REMOVAL ASSESSMENT SOIL SAMPLE LOCATION
- ▲ HRS ASSESSMENT SOIL SAMPLE LOCATION
- + REMOVAL ASSESSMENT SOIL SAMPLE LOCATION
- HISTORICAL PITS
- EXISTING EVAPORATION PITS

SOURCE: BING MAPS AERIAL HYBRID  
TDD NO: TO-0019-11-10-01  
CERCLIS NO: LAD058475419

0 250 500  
SCALE IN FEET



## US EPA REGION 6 START-3

**FIGURE 3-1**  
PROPOSED SAMPLE MAP  
SOIL LOCATIONS  
DELTA SHIPYARD REASSESSMENT  
200 DEAN COURT, HOUMA,  
TERREBONNE PARISH, LOUISIANA

DATE	PROJECT NO	SCALE
JULY, 2012	20406.012.019.000001	AS SHOWN



0 1,150 2,300

SCALE IN FEET

### Legend

- ▲ PROPOSED SAMPLE LOCATIONS
- HISTORICAL PITS
- EXISTING EVAPORATION PITS



## US EPA REGION 6 START-3

**FIGURE 3-2**  
PROPOSED SAMPLE MAP  
SEDIMENT & SURFACE WATER LOCATIONS  
DELTA SHIPYARD REASSESSMENT  
200 DEAN COURT, HOUMA  
TERREBONNE PARISH, LOUISIANA

DATE  
JULY, 2012

PROJECT NO  
20406.012.015.000.001

SCALE  
AS SHOWN

SOURCE: BING MAPS HYBRID  
TDD NO: TO-0019-11-10-01  
CERCLIS NO: LAD058475419

## **APPENDIX A**

### **EPA CONTRACT LABORATORY PROGRAM GUIDANCE FOR FIELD SAMPLERS**



## **Contract Laboratory Program Guidance for Field Samplers**

# Foreword

This guidance document is designed to provide users with general information regarding environmental sample collection for the United States Environmental Protection Agency's (USEPA) Contract Laboratory Program (CLP). This document provides minimum CLP requirements, an explanation of the general sampling process sequence of events, and any related information. The appendices contain useful reference information and checklists to aid in planning and documenting sampling activities.

CLP users also are encouraged to review the Introduction to the Contract Laboratory Program document that contains a general overview of the CLP, how it works, and how to access the program. The CLP requires samplers to use the functionality provided by either the Field Operations and Records Management System (FORMS) II Lite™ software or Scribe software, which are the preferred means of creating CLP sample documentation. For guidance in using the software to record and submit sampling data, users should reference the FORMS II Lite User's Guide or Scribe reference materials.

The FORMS II Lite User's Guide, software, and training module can be downloaded from the CLP Web site at the following address:

<http://www.epa.gov/superfund/programs/clp/f2lite.htm>

The Scribe software can be accessed from the USEPA Environmental Response Team (ERT) at the following address:

[http://www.ertsupport.org/scribe\\_home.htm](http://www.ertsupport.org/scribe_home.htm)

The ERT User Manual for Scribe, reference, and training materials can be accessed from the Scribe Support Web site at the following address:

<http://www.epaosc.org/scribe>

Both the Introduction to the Contract Laboratory Program and the Contract Laboratory Program Guidance for Field Samplers can be downloaded from the CLP Web site at the following address:

<http://www.epa.gov/superfund/programs/clp/guidance.htm>

For more information regarding the CLP or this guide, please contact Eric Reynolds via email at [reynolds.eric@epa.gov](mailto:reynolds.eric@epa.gov) or via telephone at (703) 603-9928.

## Key Information

Text in [blue](#) and underlined indicates an external link to information outside of this document.

The images below are located throughout the document to draw attention to important information and each are labeled accordingly:



**Important**



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<b>ARO</b>	Aroclor
<b>ASB</b>	Analytical Services Branch
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CLP</b>	Contract Laboratory Program
<b>CLP PO</b>	CLP Project Officer
<b>CRQL</b>	Contract Required Quantitation Limit
<b>CVAA</b>	Cold Vapor Atomic Absorption
<b>DOT</b>	Department of Transportation
<b>DQO</b>	Data Quality Objective
<b>dbf</b>	Database Format File
<b>ESDS</b>	Electronic Sample Documentation System
<b>ERT</b>	Environmental Response Team (USEPA)
<b>ET</b>	Eastern Time
<b>FORMS II Lite™</b>	Field Operations Records Management System II Lite
<b>FSP</b>	Field Sampling Plan
<b>HCN</b>	Hydrocyanic acid
<b>IATA</b>	International Air Transport Association
<b>ICP-AES</b>	Inductively Coupled Plasma-Atomic Emission Spectroscopy
<b>ICP-MS</b>	Inductively Coupled Plasma-Mass Spectrometry
<b>MA</b>	Modified Analysis
<b>MS</b>	Matrix Spike
<b>MSD</b>	Matrix Spike Duplicate
<b>NaHSO<sub>4</sub></b>	Sodium Bisulfate
<b>NPL</b>	National Priorities List
<b>OSC</b>	On-scene/on-site Coordinator
<b>OSHA</b>	Occupational Safety and Health Administration
<b>OSRTI</b>	Office of Superfund Remediation and Technology Innovation
<b>OSWER</b>	Office of Solid Waste and Emergency Response
<b>PAHs</b>	Polycyclic Aromatic Hydrocarbons
<b>PCBs</b>	Polychlorinated Biphenyls
<b>PE</b>	Performance Evaluation
<b>ppb</b>	Parts-Per-Billion
<b>ppt</b>	Parts-Per-Trillion
<b>PRP</b>	Potentially Responsible Party
<b>PT</b>	Proficiency Testing
<b>PTFE</b>	Polytetrafluoroethylene
<b>PVC</b>	Polyvinyl Chloride
<b>QA</b>	Quality Assurance
<b>QAPP</b>	Quality Assurance Project Plan
<b>QASPER</b>	Quality Assurance Sampling Plan for Environmental Response
<b>QATS</b>	Quality Assurance Technical Support
<b>QC</b>	Quality Control
<b>RAS</b>	Routine Analytical Services
<b>RPM</b>	Remedial Project Manager
<b>RSCC</b>	Regional Sample Control Center Coordinator
<b>SAM</b>	Site Assessment Manager
<b>SAP</b>	Sampling Analysis Plan
<b>SARA</b>	Superfund Amendments and Reauthorization Act
<b>SDG</b>	Sample Delivery Group
<b>SMC</b>	System Monitoring Compound

<b>SMO</b>	Sample Management Office
<b>SOP</b>	Standard Operating Procedure
<b>SOW</b>	Statement of Work
<b>SVOA</b>	Semivolatile Organic Analyte
<b>TR/COC</b>	Traffic Report/Chain of Custody
<b>txt</b>	Text File
<b>UN</b>	United Nations
<b>USEPA</b>	United States Environmental Protection Agency
<b>VOA</b>	Volatile Organic Analyte
<b>XML</b>	eXtensible Markup Language

# 1.0 INTRODUCTION

## 1.1 About this Guide

This document describes the important organizational roles and responsibilities for those who plan and conduct environmental sample collection projects for analysis through the Superfund's Contract Laboratory Program (CLP). This chapter introduces the structure and purpose of this document. Chapter 2, *Pre-field Activities*, addresses pre-field planning activities that the sampling team could complete prior to the actual sampling event. Chapter 3, *In-field Activities*, addresses those activities that need to be completed during the sampling event.

Appendix A describes the functions within a sampling project which are taken from the Quality Assurance Project Plan (QAPP) requirements. Appendix B and Appendix C contain the sample collection guidelines for Volatile Organic Analytes (VOAs) in soil and in water. Appendix D recommends sampling techniques. Appendix E contains checklists to help the sampler ensure that all necessary steps are completed. Appendix F contains the glossary of terms. Appendix G contains the FORMS II Lite analysis codes. Appendix H contains the Scribe analysis codes.



A project and site-specific QAPP providing Regional guidance will override guidance given within this document.

## 1.2 Overview of the CLP

The CLP is a national network of USEPA personnel, commercial laboratories, and support contractors whose fundamental mission is to provide data of known and documented quality. The CLP supports USEPA's Superfund program which was established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and presently exists under the Superfund Amendments and Reauthorization Act (SARA) of 1986. The CLP is directed by the USEPA Analytical Services Branch (ASB) from within the Office of Superfund Remediation and Technology Innovation (OSRTI) in the Office of Solid Waste and Emergency Response (OSWER).

The CLP primary service is the provision of analytical data of known and documented quality to CLP customers through its routine and modified chemical analytical services. The CLP has implemented supporting services to ensure that data of known and documented quality is provided to CLP users. Because of its supportive infrastructure, the CLP is able to provide all services in a cost-effective and efficient manner. To achieve this goal, the CLP has established strict Quality Control (QC) procedures and detailed documentation requirements. Current CLP users include the USEPA Regions, States and Tribal governments, and other Federal agencies. CLP users also are encouraged to review the *Introduction to the Contract Laboratory Program* document that contains a general overview of the CLP, how it works, and how to access the program.

### 1.2.1 Key Players Within the CLP

In coordinating Superfund sampling efforts, the ASB is supported by the Sample Management Office (SMO) contractor, Regional CLP Project Officers (CLP POs), Regional Sample Control Center Coordinators (RSCCs), Site Assessment Managers (SAMs), On-scene/On-site Coordinators (OSCs), and Remedial Project Managers (RPMs). Samplers may work directly with the RSCC, and/or an OSC from the Site Support Personnel during a sampling event. See Table 1-1 for a brief description of the functions performed by key participants (functions may vary by Region).

**Table 1-1. Participants in the CLP Sampling Process**

Participants	Responsibilities
<b>Analytical Services Branch</b>	<p>USEPA ASB directs the CLP from within the Office of Superfund Remediation and Technology Innovation (OSRTI) in the Office of Solid Waste and Emergency Response (OSWER). ASB responsibilities include:</p> <ul style="list-style-type: none"> <li>• Development of the Statements of Work (SOWs) that define required analytical methods (including QC, detection/quantitation limits, and holding times) for the analytical services procured under the CLP;</li> <li>• Development and implementation of policies and budgets for Superfund analytical operations;</li> <li>• Development of information management policies and products for analytical data;</li> <li>• Management of SMO and Quality Assurance Technical Support (QATS) contracts;</li> <li>• National administration, evaluation, and management of the CLP; and</li> <li>• Direction of CLP Quality Assurance (QA) activities in coordination with overall OSWER QA activities.</li> </ul> <p>To obtain the most current ASB contact list, refer to the following Web site:  <a href="http://www.epa.gov/superfund/programs/clp/contacts.htm#ASB">http://www.epa.gov/superfund/programs/clp/contacts.htm#ASB</a></p>
<b>CLP Sample Management Office</b>	<p>The contractor-operated SMO provides necessary management, operations, and administrative support to the CLP. SMO receives Regional analytical requests, coordinates and schedules sample analyses, and tracks sample shipments. SMO also receives and checks data for completeness and compliance, processes laboratory invoices, and maintains a repository of sampling records and program data.</p>
<b>CLP Contract Laboratories</b>	<p>The contractor-operated laboratories within CLP provide necessary analytical services for the isolation, detection, and quantitation of the CLP's target compounds and analytes. To obtain the most current list of CLP Contract Laboratories, refer to the following Web site:  <a href="http://www.epa.gov/superfund/programs/clp/download/lablist.pdf">http://www.epa.gov/superfund/programs/clp/download/lablist.pdf</a></p>
<b>Regional CLP Project Officer</b>	<p>The CLP PO monitors the technical performance of the contract laboratories in each Region. The CLP PO works closely with ASB Program Managers to identify and resolve laboratory technical issues, and leads laboratory on-site evaluations. To obtain the most current CLP PO contact list, refer to the following Web site:  <a href="http://www.epa.gov/superfund/programs/clp/reglist.htm">http://www.epa.gov/superfund/programs/clp/reglist.htm</a></p>
<b>Regional Sample Control Center Coordinator</b>	<p>In most Regions, the RSCC coordinates sampling efforts and serves as the central point-of-contact for sampling questions and problems. The RSCC works with SMO to schedule sample shipments to laboratories. In addition, the RSCC's activities may include: informing SMO of sample shipment, cancellations, special instructions, and sampling issues. To obtain the most current RSCC contact list, refer to the following Web site:  <a href="http://www.epa.gov/superfund/programs/clp/reglist.htm">http://www.epa.gov/superfund/programs/clp/reglist.htm</a></p>
<b>Site Support Personnel</b>	<p>The Site Support Personnel consists of the USEPA personnel responsible for developing the Quality Assurance Project Plan (QAPP) and Sampling Plan for the sampling episode at the site, such as the sampling team, Quality Assurance personnel, OSC, SAM, and Remedial Project Manager (RPM). In most Regions, the Site Support Personnel develops Standard Operating Procedures (SOPs) for field sampling and related procedures, and assists sampling teams in following those SOPs. The sampling team determines what type(s) of CLP services will be required for a particular sampling event. The Site Support Personnel reviews Sampling Analysis Plans (SAPs) prepared by sampling teams and oversees sampling teams in the field.</p>

## 1.3 Overview of the Sampling Process

Once USEPA has determined that physical, chemical, and/or biological testing of a site is necessary, samples of material from the site area must be collected. The type of material that must be collected and the analytical method to be used depends upon the physical location of the site, detection level(s), site history (previous sampling), and known or unknown conditions and contaminants. The sampling process includes carefully planned and consistently applied procedures that produce accurate and legally defensible data. The sampling team should consider the procedures and plans presented in this guide as minimum sampling process guidelines to maintain sample integrity and identity. Samples should be collected according to the approved project and site-specific QAPP and SAP. This document does not define specific sampling procedures because specific sampling protocols depend on individual site conditions, Regional requirements, and acceptance and performance criteria. Since Regions may have their own specific requirements for individual sampling programs, they are responsible for generating Region-specific sampling SOPs.

### At-a-Glance: Overview of the Sampling Process

- ✓ Procedures must be consistent.
- ✓ Analytical data must be accurate and defensible.
- ✓ Procedures must meet minimum requirements.

### 1.3.1 Procedures Must Be Consistent

The purpose of sampling is to collect representative portions from a suspected contaminated site. Sample collection is critical to determining the presence, type, concentration, and extent of environmental contamination by hazardous substances; thus it is a crucial part of every sampling and environmental testing effort. Sampling procedures must be consistently written and followed to mitigate risk of error and the expense of re-sampling.

Failure to follow proper sampling and shipping procedures could result in samples that are contaminated, broken, mislabeled, lost during shipping, or unusable because of a missed holding time. If procedures are inconsistently or improperly followed, any resultant analytical data may be inaccurate and may not be defensible in a court of law.



If re-sampling is needed due to improper sampling, the sampling team may incur the cost.

### 1.3.2 Analytical Data Must Be Accurate and Defensible

The data gathered during sampling activities helps to accurately characterize contaminated waste sites so that the impact on human health and the environment can be properly evaluated. Acquiring accurate and defensible data that will be accepted in a court of law is the CLP's primary objective; therefore, the sampler must collect samples according to strict sampling procedures, plans, and guidelines. USEPA and many other Federal agencies use data resulting from analytical testing of samples to:

- Determine if a site is contaminated with organic and/or inorganic compounds
- Identify pollution sources and Potentially Responsible Parties (PRPs)
- Validate remedial design methodologies
- Assess response and remedial priorities
- Assess risk to human health and the environment
- Determine appropriate cleanup actions
- Determine cleanup achievements

### 1.3.3 Sampling Procedures and Guidelines Must Meet Minimum Requirements

It is imperative that samplers be aware of the minimum CLP and Regional requirements that directly impact and define how a sampling event will take place. It is important to note that the procedures and guidelines set forth in this document are considered minimum CLP requirements. Samplers should reference the following sections within this document that specifically address important requirements that must be met for a successful sampling event:

- Section 1.4.3 CLP Documentation Requirements
- Section 2.4.1 Request Scheduling of Analysis, SMO-assigned CLP Case Numbers, CLP Sample Numbers, and Laboratory Contact Information
- Section 2.7 Comply with Transportation and Shipping Requirements
- Section 2.8 Provide Shipment Notification
- Section 3.1 Collect Samples
- Section 3.2 Complete Documentation

## 1.4 Overview of Sampling Documentation Requirements

The sampler must properly document samples collected for analysis in order to uniquely identify each sample and ensure adequate chain-of-custody procedures. When collecting samples, the sampler should always keep in mind that any samples collected may be used in future litigation. This is especially important when samples are from privately owned property. If sampling on privately owned property, samplers should also provide the property owner with a receipt for samples collected and removed from that owner's property. Samplers may also be required by a Region to use a sample label, sample tag, or field operations records documenting information such as daily activities, equipment and materials used, personnel involved, site security, etc. These types of documentation help ensure proper sample identification and provide additional chain-of-custody records.

The documentation required by a Region for a sampling event is outlined in project plans such as the QAPP, SAP, and Field Sampling Plan (FSP).

#### At a Glance: Overview of the Sampling Document Requirements

- ✓ Must use FORMS II Lite or Scribe to create sample documentation. Analytical data must be accurate and defensible.
- ✓ CLP documentation requirements:
  - CLP Sample number
  - SMO-assigned CLP Case number
  - Traffic Report/Chain of Custody (TR/COC) record
  - Sample labels
  - Sample tags
  - Custody seals
  - Field operation records



Under no circumstances should the site name appear on any documentation that is sent to the laboratory (for the CLP).

The two sampling documentation software tools prescribed and used by the CLP are: Field Operations Records Management System II Lite (FORMS II Lite) and Scribe.

### 1.4.1 FORMS II Lite

In an effort to automate sample documentation in the field, ASB has developed a stand-alone, Windows-based software application that samplers can use to automatically create and generate sample documentation. The FORMS II Lite software allows users to enter information prior to and during sampling events. It allows users to multi-task and electronically create, edit, and print documentation associated with sampling activities. Users can customize data entry screens throughout the entire documentation process. Users can also customize the format and content of sample labels based on specific requirements.

The program simplifies and accelerates the tedious manual sample documentation process by reducing the generation of handwritten documents by almost 70%. The FORMS II Lite software enables samplers to:

- Augment CLP-provided Sample numbers or manually assign their own unique, project-specific non-CLP Sample numbers
- Input the SMO-assigned CLP Case Number into the appropriate field
- Create sample labels, sample tags, TR/COC Records, Sample Weight forms, and receipts for samples taken from a site
- Track samples from the field to the laboratory
- Electronically capture sample information into databases
- Export electronic data as a database format (.dbf) file, text (.txt), or eXtensible Markup Language (.xml) file

For assistance with obtaining or using the FORMS II Lite software, please contact the FORMS II Lite Help Desk at 703-818-4200 from 9:00 AM - 5:00 PM Eastern Time (ET). For additional information regarding FORMS II Lite use and training, please refer to the following Web site:

<http://www.epa.gov/superfund/programs/clp/f2lite.htm>

### 1.4.2 Scribe

In an effort to automate sample documentation in the field, the USEPA Environmental Response Team (ERT) has developed a stand-alone, Windows-based desktop application that samplers can use to automatically create and generate sample documentation. The Scribe software allows users to enter information prior to and during sampling events. It allows users to multi-task and electronically create, edit, and print documentation associated with sampling activities. Users can customize data entry screens throughout the entire documentation process. Users can also customize the format and content of sample labels based on specific requirements.

The Scribe application simplifies and accelerates the tedious manual sample documentation process by reducing the generation of handwritten documents. Scribe enables samplers to:

- Augment CLP-provided Sample numbers or manually assign their own unique, project-specific non-CLP Sample numbers
- Input the SMO-assigned CLP Case Number into the appropriate field
- Electronically capture sample information into databases
- Create sample labels, sample tags, COC Records, and receipts for samples taken from a site
- Track samples from the field to the laboratory
- Electronically capture laboratory results, property details and sample location details
- Export electronic data as a database format ( .mdb) file, text (.txt), or eXtensible Markup Language (.xml) file

The Scribe CLP Analysis Codes provided in Appendix H may cause a delay in processing at the CLP laboratories based on interpretation.



**Samplers are advised to use the analysis codes found in Appendix G: FORMS II Lite Analysis Codes for CLP analysis.**

Scribe users should contact the ERT Software Support Help Desk for assistance in adding the custom analysis onto Scribe. For assistance with obtaining or using Scribe software, please contact the ERT Software Support Help Desk at 800-999-6990. For additional information regarding Scribe use and training materials, please refer to the following Web site:

<http://www.epaosc.org/Scribe>

### 1.4.3 CLP Documentation Requirements

Samplers must:

- 1) Record the CLP Sample Number and the SMO-assigned CLP Case Number on each sample bottle

- 2) Complete the Traffic Report/Chain of Custody (TR/COC) record using the FORMS II Lite or Scribe software, making sure to indicate on the TR/COC record if the samples require the use of a Modified Analysis
- 3) Complete and attach sample labels
- 4) Complete and attach sample tags to meet Regional requirements (if applicable)
- 5) Complete and attach custody seals to meet Regional requirements
- 6) Complete field operations records, as necessary

Please contact your RSCC (see Table 1-1) for information regarding CLP Sample numbers, SMO-assigned CLP Case numbers, TR/COC records, and chain of custody seals for sampling events.

#### **1.4.3.1 CLP Sample Number**

A *CLP Sample Number* is unique per sampling location, is used to identify and track samples throughout the sampling and analytical processes, and is recorded on many types of sampling documentation (e.g., TR/COC Records, sample labels, and sample tags). CLP Sample Numbers are provided to samplers by their RSCC or SMO. The CLP Sample Number should not contain the letters "I," "O," "U," and "V."

Samplers must contact their RSCC (or designee) to obtain CLP Sample numbers for their sampling event. Samplers must correctly assign the CLP Sample numbers to the appropriate sample bottle or container. Please refer to Section 3.2.1 for more detailed information regarding the use of CLP Sample Numbers.



Contact the RSCC with any questions regarding the assignment of CLP sample and SMO-assigned Case numbers.

#### **1.4.3.2 SMO-assigned CLP Case Number**

SMO-assigned CLP Case numbers are used to track groups of samples throughout the sampling and analytical processes and are recorded on many types of sampling documentation (e.g., TR/COC records, sample labels, and/or sample tags). Samplers must correctly assign the SMO-assigned CLP Case number to the appropriate sample bottle or container. To obtain a SMO-assigned CLP Case number, samplers may contact their RSCC (or designee) to obtain their laboratory assignment notification or they may be provided by SMO.

#### **1.4.3.3 Laboratory Assignment**

Samplers are responsible for shipping samples to the appropriate SMO-assigned laboratory for analysis. Samplers may contact their RSCC (or designee) to obtain their laboratory assignment notification or they may be provided by SMO.

#### **1.4.3.4 TR/COC Record**

The TR/COC record is used as physical evidence of sample custody and functions as a permanent record of each sample collected.

Per CLP documentation requirements, each cooler must contain a TR/COC record that lists all the samples contained therein.

#### **1.4.3.5 Chain-of-Custody Seals**

A chain-of-custody seal is any adhesive label or tape that can be used to seal a sample bottle, container, plastic bag, or shipping cooler such that if it is opened or tampered with, the seal will be broken. Custody seals must be placed on each sample bottle, container, or bag (as appropriate) and each shipping cooler or container. The custody seal is an excellent means of maintaining a record of chain-of-custody, as well as guarding against possible sample contamination or tampering during shipping.

#### **1.4.3.6 Sample Labels**

A sample label is a sticker attached to a sample bottle or container that contains a field sample or QC sample. Sample labels are affixed to each sample container as samples are collected in

the field or affixed prior to going in the field. A sample label must contain, at a minimum, a CLP Sample number so that they can be associated with, and listed on, the associated TR/COC record. The sample label should also include the required analysis, Case number, and preservative used (to eliminate confusion at the laboratory). Samplers should refer to their project plans for Region-specific sample label requirements.

#### **1.4.3.7 Sample Tags**

A sample tag identifies a sample bottle or container that contains a sample. The tag also provides specific analytical direction and proof that a sample existed. To support the use of sample data in potential enforcement actions, samples with other than in situ measurements (e.g., pH, temperature, conductivity) can be identified with a sample tag. A CLP Sample number and SMO-assigned CLP Case number must be recorded on a sample tag to indicate that the sample container comprises the whole sample in the case where there is just one container of sample, or part of the indicated sample in the case of multiple containers of sample. Samplers should refer to their project plans for Region-specific sample tag requirements.

#### **1.4.3.8 Field Operation Records**

Samplers should maintain complete, accurate, and legible field operations records as they perform a sampling activity. The following records are included: field logbooks; Corrective Action reports; Sampling trip reports; supplemental standardized forms; logs; and records such as maps or photographs that document each step of the work performed in the field. Samplers should refer to their project plans for Region-specific field operations record requirements. These records are very important tools because they are considered part of the official project file when legal issues arise.

#### **1.4.3.9 Weight Logs**

A sample weight log identifies the tared, sample and final weights per bottle for VOA samples. In order to support Method 5035A for VOAs, samplers should enter tared and final weights per bottle in the CLP Sample Weight Log.

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## 2.0 PRE-FIELD ACTIVITIES

This chapter provides instructions for completing the suggested pre-field activities that samplers could complete prior to performing sampling activities. These important pre-field activities will save time and help the sampler to better prepare for the sampling event. Samplers should be aware of issues that routinely arise during the sampling process so that they can avoid making the same mistakes or having the same problems that could adversely affect their sampling event. Samplers are also expected to review all pertinent project plans and meet both CLP and Regional requirements that directly impact the structure and purpose of a sampling event.

The project plans provide information such as the types and numbers of samples to be collected, the analytical methods to be used based on the desired level of quantitation, and the necessary equipment and supplies. The plans also describe the sampling method which may require different specific sample volumes/masses, containers, preservation, shipping, and handling to maintain the integrity of the samples without degradation or contamination.

### At a Glance:

#### Pre-field Activities

- ✓ Prepare for and communicate during a sampling event.
- ✓ Review project plans containing Regional requirements.
- ✓ Plan to meet documentation requirements.
- ✓ Obtain any necessary permits, licenses, and clearances.
- ✓ Identify and obtain sampling materials.
- ✓ Comply with transportation and shipping requirements.
- ✓ Provide shipment notification.
- ✓ Perform Readiness Review/Run-through.

In addition to reviewing project plans, samplers should determine if the sampling site is privately or publicly owned and obtain the necessary permission to access the sampling site. If the site is privately owned, samplers should make sure to have receipts available to provide to the owner for all samples collected and removed from the property. Samplers must also prepare to identify and obtain sampling materials, prepare to meet documentation requirements by obtaining and learning to use the required software, comply with transportation and shipping requirements, and perform a readiness review/dry run of the sampling process.

## 2.1 Prepare for a Sampling Event

Samplers must prepare to meet CLP and Regional requirements for a sampling event, appropriately use the CLP Sample number and SMO-assigned CLP Case number, complete the TR/COC record using the FORMS II Lite or Scribe software, and complete and attach the custody seal(s). It is very important that the sampler include the correct CLP Sample number on each sample. It is also imperative that the TR/COC record be accurately completed and submitted with the sample(s). Finally, the sampler must accurately and legibly complete and attach a custody seal to each sample container, or plastic sample bag (as appropriate), and each shipping cooler or container.

However, meeting the sampling requirements requires more than just the proper application of a CLP Sample number on each sample, completion of the TR/COC record, and use of a custody seal. The actual collection of samples, packaging, and shipping of those samples are equally important to a successful sampling event.

For example, if a sampler collects insufficient volume of a sample, the laboratory may not be able to perform the requested analysis. Insufficient sample volumes may also result in a laboratory being unable to perform laboratory quality control, such as Matrix Spike (MS), Matrix Spike Duplicate (MSD), and Duplicates sample analysis. Additionally, if the laboratory receives a sample that is either unpreserved or the sample pH is outside of the required range, the sample cannot be properly analyzed.

Unfortunately, improper shipping and labeling processes and procedures often result in:

- Samples being shipped to the wrong laboratory
- Broken or empty samples being received at the laboratory
- Custody seals or sealant tape that is missing or broken on sample bottles, containers, plastic bags, or shipping coolers shipped to the laboratories

The importance of completing the paperwork associated with a sampling event cannot be overemphasized. Samplers must make a conscientious effort to accurately complete the TR/COC record since this is the main document used to derive vital information about a particular sample. The person completing a TR/COC record must be careful to avoid errors, such as the appropriate sample(s) not being listed, or the wrong samples being listed. In an effort to eliminate such errors and the confusion that can be associated with handwritten TR/COC records, samplers must use either the FORMS II Lite or Scribe software to complete the TR/COC record and other associated sampling documentation.

It is extremely important that QC samples, including field sample duplicates, field samples for Matrix Spike and Matrix Spike Duplicate analyses, and Proficiency Testing (PT) samples, also known as Performance Evaluation (PE) samples, be designated and labeled per Regional guidance by samplers in the field. Mislabeling of QC samples can result in improper and/or inaccurate analysis of a sample at the laboratory.

## **2.2 Communicate During a Sampling Event**

Communication is a key element in planning, administering, and conducting a sampling event. It is extremely important that all parties involved in a sampling event be in contact throughout the sampling process. The procedures and recommendations outlined in this guide are based on more than 20 years of experience. It has been demonstrated that approximately 50% of all sampling efforts have been negatively affected by incorrect sampling procedures and poor communication among participants.

The key elements of communication for a sampling event include the relationship between the RSCC, SMO, the samplers in the field, and the laboratories who will be accepting the samples. For instance, the samplers must contact the RSCC to start the process for setting up a sampling event. The RSCC will in turn contact SMO who will schedule the sampling event, establish laboratory availability, and arrange for the laboratory to accept projected samples. For MAs requesting tissue analysis, it is also important to notify the laboratory if they should be expecting whole fish, fish fillet or other types of tissues for analysis. After scheduling, SMO will communicate the laboratory assignment to the Region and possibly the sampler.

SMO provides SMO-assigned CLP Case and CLP Sample Numbers in time for the sampling event. SMO also schedules a laboratory and makes sure the laboratory will not have any capacity problems. Communication is also important because if there is a change in the sampling event due to a cancellation or an increase or decrease in the number of samples that will be sent to the laboratory, the sampler can contact the RSCC who can work with SMO to remedy potential capacity, availability, or overbooking problems.

## **2.3 Review Project Plans Containing Regional Requirements**

In addition to meeting CLP requirements, the sample collection process must fulfill numerous Regional requirements. These requirements are determined by a variety of factors that affect how samples should be collected for an individual sampling event. These factors include:

- The type of samples being collected (organic/inorganic, water, soil/sediment, etc.)
- The method by which the samples will be analyzed
- The acceptance or performance criteria [i.e., Data Quality Objectives (DQOs)]
- The type of data needed

The QAPP for each sampling project is written to meet requirements outlined in the documents *EPA Requirements for Quality Assurance Project Plans* (QA/R-5), *EPA Guidance on Quality Assurance Project Plans* (G-5), and Regional QAPP preparation documents. The QAPP is prepared in advance of field activities and is used by samplers to develop any subsequent plans such as the SAP or the FSP. Samplers should review the QAPP and any subsequent project plans for information outlining the basic components of a sampling activity. QAPP and project plans should be finalized and approved by appropriate Regional QA personnel, the OSC, SAM, or the RPM before providing them to the sampling team. This should be done prior to the start of field activities. Appendix A explains the functions within a sampling project (as these functions relate to a sampling event) and the elements of that function as described in a typical QAPP. Copies of all project plans and relevant SOPs should be maintained in the field for the duration of the sampling project.

## 2.4 Plan to Meet Documentation Requirements

Sampling events require a variety of accurate and complete documentation. Samplers should review their project plans to determine the types of documentation that must be completed for a sampling project and to ensure that the appropriate documentation will be on-hand in the field. The CLP documentation requirements include the CLP Sample Number, the SMO-assigned CLP Case Number, the TR/COC Record, sample labels, custody seals, and field operations records (as necessary). Samplers need to request SMO-assigned CLP Case and CLP Sample Numbers for each sampling event prior to starting field activities. Samplers also need to make sure that the correct TR/COC Records (Organic TR/COC Record for organic analysis or Inorganic TR/COC Record for inorganic analysis) are being used within the FORMS II Lite or Scribe software. Finally, samplers should be prepared to complete the appropriate shipping cooler return documentation.

### At a Glance:

#### Plan to meet documentation requirements.

- ✓ Request SMO-assigned CLP Case and CLP Sample Numbers.
- ✓ Prepare sample cooler return documentation.
- ✓ Prepare to use the FORMS II Lite or Scribe software.

Samplers are required to use the FORMS II Lite or Scribe software to prepare and submit sampling project documentation and maintain sample chain-of-custody. Samplers must have access to FORMS II Lite or Scribe generated TR/COC Records at sampling events. FORMS II Lite or Scribe software users must be familiar with all emergency backup procedures that should be followed in the event of a system failure. In the event of a system crash, samplers must have backup hardcopies of FORMS II Lite or Scribe TR/COC Records. For information regarding emergency backup procedures, please refer to the following Web site:

<http://www.epa.gov/superfund/programs/clp/trcoc.htm>

For assistance while using the FORMS II Lite software, please contact the FORMS II Lite Help Desk at 703-818-4200 from 9:00 AM - 5:00 PM ET.

For assistance while using the Scribe software, please contact the ERT Software Support Help Desk at 800-999-6990 from 9:00 AM - 5:00 PM ET. Refer to the following web site for additional information on the use and training of Scribe:

<http://www.epaossc.org/Scribe>

### 2.4.1 Request Scheduling of Analysis, SMO-assigned CLP Case Numbers, CLP Sample Numbers, and Laboratory Contact Information

SMO-assigned CLP Case Numbers are assigned based on a request for CLP Routine Analytical Services (RAS), which is processed through the RSCC (or designee). The sampler must request the RSCC to schedule CLP RAS analysis. The sampler should specify the number of samples, analyses, etc., being shipped each week when requesting the RSCC to schedule CLP RAS analyses. The CLP does have the capacity to schedule sampling on an emergency basis, however the sampler must contact the RSCC (or designee) to obtain details regarding how to handle such a situation. When scheduling a sampling event that will last for more than one week, it is recommended that the sampler contact the RSCC (or designee) on a weekly basis to provide updates. This contact between the sampler, the RSCC (or designee), and SMO is very important because it will ensure better availability of laboratory capacity.

In addition to SMO-assigned CLP Case and CLP Sample numbers, samplers should make sure to have accurate laboratory contact information, such as:

- Laboratory name
- Laboratory address
- Contact name
- Laboratory phone number

This information which is provided on the Regional Lab Assignment Notification Form is used for both TR/COC records and chain-of-custody documentation and shipping paperwork such as address labels and airbills.

The SMO-assigned CLP Case number is used to track groups of samples throughout the sampling and analytical processes. Samplers must correctly indicate the assigned Case number on the appropriate sample bottle or container.



The RSCC (or designee) provides the CLP Case numbers and Sample numbers for each sampling event to samplers. Once the CLP Sample numbers have been provided to the sampler, the sampler can use FORMS II Lite or Scribe to print them onto sample labels.

A CLP Sample number is defined as a number that is unique per sampling location and identifies each CLP sample (see Section 1.4.3.1). Since samples must be identified per analytical program (either organic or inorganic), there are two types of TR/COC Records and two letter codes to denote organic vs. inorganic analysis.

A CLP sample is defined as one discrete portion of material to be analyzed that is contained at one concentration level, from one station location for each individual or set of analyses -- provided the analyses are all requested for the same CLP analytical service (i.e., organic or inorganic), and identified by a unique Sample number.



When samples are collected from several station locations to form a composite sample, the sample should be assigned either a number from one of the station locations used during collection, or a unique number that represents the composite sample, for tracking purposes. The numbering scheme used internally at a sampling event for identifying composite samples should also be documented appropriately (e.g., in the field logs).

Organic CLP Sample numbers begin with the Regional letter code, followed by four letters and/or numbers. Inorganic CLP Sample numbers begin with "M" followed by the Regional letter code and then four letters and/or numbers. See Table 2-1 for Region and letter codes for each sample type (i.e., organic or inorganic).

**Table 2-1. CLP Sample Number Letter Codes**

Region	Letter Code	
	Organic	Inorganic
1	A	MA
2	B	MB
3	C	MC
4	D	MD
5	E	ME
6	F	MF
7	G	MG
8	H	MH
9	Y	MY
10	J	MJ

According to CLP guidelines, each individual inorganic water sample may be analyzed for total metals or filtered metals, but not both. Therefore, water samples collected for total metal and filtered metal analyses from the same sampling location must be assigned separate (unique) CLP Sample numbers. A sampler can use the same CLP Sample Number for an inorganic soil or water sample collected for total metals, mercury and cyanide analyses.

**Organic soil and water samples** may be collected for analysis under the SOM01.X SOW to detect:

- Aroclors
- Semivolatile Organic Analytes (SVOAs)
- SVOA Selective Ion Monitoring (SIM)
- Pesticides
- Volatile Organic Analytes (VOAs)
- Trace Volatile Organic Analytes (Trace VOAs)
- Trace VOA SIM

**Inorganic soil and water samples** may be collected for analysis under the ISM01.X SOW to detect:

- Cyanide using Distillation/Colorimetry
- Metals using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES), Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
- Mercury using Cold Vapor Atomic Absorption (CVAA)

**Inorganic wipes and air filter samples** may be collected for metals using ICP-AES under ISM01.X SOW.

## 2.4.2 Prepare Sample Cooler Return Documentation

CLP laboratories must routinely return sample shipping coolers to the appropriate sampling office within 14 calendar days following receipt of shipment from the sampler. For sample coolers to be returned, the sampler must complete the appropriate cooler documentation and work with Regions and government agencies to provide a cost-effective mechanism for laboratories to return the empty coolers to the appropriate sampling office. The sampling cooler return documentation should be prepared in advance and provided to samplers before field activities begin. **The sampler (not the CLP laboratory) is responsible for paying for the return of the cooler and should also include shipping airbills bearing the sampler's account number, as well as a return address, to allow for cooler return.**

To maintain consistency among cooler transportation programs, samplers should:

- Minimize the use of multiple transportation carriers to avoid confusion
- Use multiple-copy labels so the laboratory and the sampling team can each retain a copy for their records
- Prepare labels in advance so that the laboratory can simply affix a completed shipping label on the cooler
- Include third-party billing information (i.e., their shipping account number) on labels so the laboratory will not be billed by the transportation carrier
- Confirm that the laboratory knows which transportation carrier to use
- Include the SMO-assigned CLP Case Number on return information

## 2.5 Obtain Municipal Permits, Licenses, and Clearances

Before starting a sampling event, samplers must make sure to obtain the proper municipal permits, accesses to the property, and any government clearances, if required. The sampler must also contact any appropriate utility companies to ascertain where any underground pipes, cables, etc., may be located.

### At a Glance:

#### Obtain permits, licenses, and clearances.

- ✓ Request access to County, State, Tribal, military, and/or Federal property.
- ✓ Contact private property owner(s).
- ✓ Contact utility companies.

### 2.5.1 Request Access to County, State, Tribal, Military, and/or Federal Property

Proper access to perform sampling activities is important not only for legal reasons, but also to eliminate delays in work and possible refusal to allow sampling to take place. It is crucial that the appropriate permits, licenses, and clearances be secured to obtain access for sampling activities that will be performed on County, State, Tribal, military, and/or Federal property. The sampler must contact the appropriate government offices or personnel well in advance to determine what kinds of approval are required. Pre-approval may be required for specific types of sample collection such as drilling or excavation. For example, drilling on a military base requires pre-approval. Base security may require clearances for all members of the sampling team, including subcontractors. This process may take two or more days.

If arrangements are not made in advance, the team may not be allowed to enter the site until their clearances are processed and the team has been approved to drill. As a result, the sampling schedule is delayed, costing extra time and money.

## 2.5.2 Contact Private Property Owners

The sampler must obtain written permission from the private property owner(s) before sampling on their property, even if verbal permission has been granted. It is recommended that samplers obtain verbal permission prior to their arrival at the sampling location, but written permission can be obtained on the day of sampling. If a property owner refuses to grant access to their property, it may be necessary for sampling participants to contact the appropriate authorities for assistance.

## 2.5.3 Contact Utility Companies

The sampler should contact local utility companies (e.g., power, phone, gas, cable, sanitation, etc.) at least one week prior to the sampling event to have underground cables, lines, and pipes flagged and marked. This is required by law. A national one-call directory can be found at:

<http://www.call811.com>.

This will eliminate potential safety hazards and service disruption. For example, soil sampling in a residential area may require digging below the soil's surface. It is very important to know where utility lines and pipes are located so that samplers do not hit live electrical wires or rupture gas lines. Samplers should follow Regional or other appropriate program procedures for the procurement of such services. The utility service(s) disruption dates should be confirmed at least two days prior to sampling activities.



Pre-payment of survey fees to local utility companies may be required.

## 2.6 Identify and Obtain Sampling Materials

Samplers must be prepared for a sampling project with the appropriate sampling materials (equipment, supplies, sample containers, packing materials, and shipping materials). The equipment and supplies must be properly cleaned, calibrated, and tested as necessary to meet the needs of the sampling project.

### At a Glance:

#### Identify and obtain sampling materials.

- ✓ Procure appropriate equipment and supplies.
- ✓ Procure sample containers.
- ✓ Procure shipping supplies.

### 2.6.1 Procure Appropriate Equipment and Supplies

Each sampling event requires the procurement of equipment and materials to collect, document, identify, pack, and ship samples. The proper field sampling equipment is vital to a successful sample collection. Regional or other samplers should obtain, and arrange in advance, all of the equipment and supplies required for each sampling event. Samplers should review the project plans to verify that the proper equipment is being used for sample collection.

At a minimum, the following materials are generally required during a sampling event:

- Sample storage containers
- Packing material
- Sample containers
- Shipping containers
- Access to the FORMS II Lite or Scribe software for creating sample labels, stickers, tags, and TR/COC Records
- Custody seals
- Sampling equipment such as bowls, augers, pumps, etc

Sampling events may also require specific items such as:

- Cooler temperature blanks
- Trip blanks for VOA analysis
- Preservation supplies (e.g., ice or acid)
- Specially prepared sample vials (e.g., for SW-846 Method 5035A)
- Utensils or equipment in handling tissue samples requested by modified analysis

## 2.6.2 Procure Sample Containers

The analytical protocol(s) to be used for sample analysis often requires the use of a particular type of sample container. The type of container also may depend on the sample matrix and analysis. It is recommended that samplers use borosilicate glass containers, which are inert to most materials, when sampling for pesticides and/or other organics. Conventional polyethylene is recommended when sampling for metals because of the lower cost and absorption rate of metal ions.

Using the wrong container may result in breakage, gathering of an insufficient volume needed to perform sample analysis, or the container material may interfere with the analysis. Therefore, samplers should identify and use the correct sample containers for each sampling event.



Have extra containers readily available for each sampling event in case of breakage, loss, or contamination.

Containers procured for a sampling event are usually pre-cleaned and shipped ready for use from the manufacturer to the sampling site. Regardless of the type of container used, samplers must ensure that the containers have been analyzed or certified clean to levels below concern for the project. These containers must meet the USEPA container type specifications listed in Table 2-2.



Samplers should document the lot numbers for every lot of cleaned containers used for each project and maintain corresponding certificates of analysis on file and available upon request.

**Table 2-2. Sample Container Type Specifications**

Reference Number	Container Type	Specifications	
		Closure	Septum
1	40 mL amber glass vial, 24 mm neck finish.	Polypropylene or phenolic, open-top screw-cap, 15 cm opening, 24-400 size.	24 mm disc of 0.005 in. Polytetrafluoroethylene (PTFE) bonded to 0.120 in. silicone for a total thickness of 0.125 in.
2	1 L high density polyethylene, cylinder-round bottle, 28 mm neck finish.	Polyethylene cap, ribbed, 28-410 size; F217 polyethylene liner.	N/A
3	8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish.	Polypropylene or phenolic cap, 70-400 size; 0.015 in. PTFE liner.	N/A
4	4 oz (120 mL) tall, wide mouth, straight-sided, glass jar, 48 mm neck finish.	Polypropylene or phenolic cap, 48-400 size; 0.015 in. PTFE liner.	N/A
5	1 L amber round glass bottle, 33 mm pour-out neck finish.	Polypropylene or phenolic cap, 33-430 size; 0.015 in. PTFE liner.	N/A
6	500 mL high density polyethylene, cylinder-round bottle, 28 mm neck finish.	Polypropylene cap, ribbed, 28-410 size; F217 polyethylene liner.	N/A
7	Coring tool used as a transport device (e.g., 5 g Sampler).	Has built-in closing mechanism.	N/A
8	250 mL high density polyethylene, cylinder-round bottle, 28 mm neck finish.	N/A	N/A
9	1 qt polymer zip-top bag	Has built-in closing mechanism.	N/A

**Table 2-2. Sample Container Type Specifications**

Reference Number	Container Type	Specifications	
		Closure	Septum
10	Filter cassette used as transport device	N/A	N/A
11	Heavy duty aluminum foil	N/A	N/A

The information contained in this table is also cross-referenced in the sample collection parameters discussed in Chapter 3. The container Reference Numbers are used in Tables 3-2 to 3-5 under the Containers column. For example, samples collected for low-level soil VOA analysis using SW-846 Method 5035A may require the sampler to use pre-prepared, tared closed-system purge-and-trap vials with a preservative (refer to Appendix B). Refer to the Regional QAPP and Appendix D for additional references.

### 2.6.3 Procure Shipping Supplies

Samples should be correctly packaged into the appropriate shipping containers to reduce the risk of breakage or leakage, and the shipping containers should be appropriately prepared for shipment. Before heading into the field, samplers should refer to the appropriate project plans to determine the types of samples that will be taken during the sampling project so that samplers will have the proper packaging materials at the site for all pertinent sample container types and sample matrices.

Samplers should also make sure to obtain the appropriate shipping paperwork (e.g., shipping forms required by the delivery service).



The CLP strongly discourages the use of vermiculite and cat litter as sources for packing material. These materials interfere with labeling and documentation and are difficult to remove from sample containers and shipping containers.

## 2.7 Comply with Transportation and Shipping Requirements

Samplers are expected to review the applicable project plans to be aware of all State, Federal, Department of Transportation (DOT), and International Air Transport Association (IATA) regulations governing environmental and hazardous sample packaging. The person who ships the samples is responsible for being in compliance with applicable packaging, labeling, and shipping requirements.



Samplers should request and receive USDA soil permits for soil samples shipped from outside the continental United States, prior to shipping.

Additional information can be obtained on Hazardous Materials Safety Program regulations from the DOT's Research and Special Programs Administration. Federal transportation regulations can be found in 49-CFR Parts 100-185, and are available on the Internet at:

<http://www.phmsa.dot.gov/hazmat/regs>

## 2.8 Provide Shipment Notification

Some Regions may require that samplers notify their RSCC (or designee) when samples are shipped, and some Regions allow samplers to contact SMO directly to provide shipment notification. It is recommended that samplers contact the RSCC of sample origin to verify if such notification is necessary. If samplers are shipping samples after 5:00 PM ET, samplers must notify the RSCC (or designee) and SMO by 8:00 AM ET on the following business day.



For Saturday delivery at the laboratory, samplers **MUST** notify the RSCC (or designee) and SMO as soon as possible so that SMO will receive the delivery information by 3:00 PM ET on the Friday prior to delivery.

## **2.9 Perform Readiness Review/Dry Run**

A readiness review/dry run is a test run of the proposed sampling event. This is a recommended practice since it gives samplers a chance to check all plans, documentation software (i.e., FORMS II Lite or Scribe), and equipment lists for accuracy and completeness prior to sampling activities. It also provides an opportunity to consult with sampling team members to make sure all the elements are in place and everyone understands their task before actually going out to the field. Sampling project managers should provide the readiness review or dry run dates and schedules to samplers so that samplers can prepare accordingly.

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## 3.0 IN-FIELD ACTIVITIES

This chapter addresses the in-field activities a sampler will focus on during a sampling event such as determining the type of samples to be collected; collecting the samples; meeting volume, preservation, and holding time requirements; completing documentation; and packing and shipping samples.

When performing a sampling event, the sampler is expected to follow prescribed sampling techniques. The sampler should also be aware of any special sampling considerations, contamination issues, and sample compositing and mixing methods that could affect their sampling efforts. Please refer to Appendix D for more detailed information.

### At-a-Glance: In-field Activities

- ✓ Collect samples
- ✓ Complete documentation
- ✓ Provide sample receipts
- ✓ Procure shipping
- ✓ Pack and ship samples



Appropriate Regional guidance and procedures should be consulted for detailed sample collection, preservation, handling and storing, equipment decontamination, and QA/QC procedures.

## 3.1 Collect Samples

CLP RAS are generally used to analyze samples from Superfund sites. The matrices can be water, soil, sediment, filter, or wipe. Additional matrices requested under modified analysis may include oil, sludge, ash, biosolid or tissue.

A CLP sample consists of all sample aliquots (portions), provided that the analyses are all requested from the same CLP analytical program:

- for each individual or set of analytical analyses
- from one station location
- for one sample matrix
- at one concentration level
- for one laboratory
- for one analytical program

In some instances, a mixed-matrix sample may be collected which contains either a supernate (for a sediment/soil sample) or a precipitate (for a water sample). In this event, samplers should consult their sampling plans and/or discuss the required procedures with the RPM (or designee). In general, it is recommended that two individual samples be collected by separating the aqueous layer from the solid/precipitate layer at the point of collection if possible. If the phases or layers cannot be separated effectively in the field at the point of collection, arrangements should be made to separate the layers under controlled conditions at the receiving laboratory. In this case, additional sample numbers will be needed for the separate phases. They may be assigned two different sample IDs (e.g., Sample IDs ABC124 and ABC125 for Sample ID ABC123), along with a note in the field sample log or tracking system that the sample IDs are derived or related to the same sample ID, to ensure correct follow-up upon receipt of results from the laboratory.

### 3.1.1 Determine Types of Samples to be Collected

Samplers may be required to take several types of samples or sample aliquots during a sampling event. They should refer to their project plans to determine the types of samples or aliquots to be taken, the volumes needed of each sample or aliquot, and the preservation needed for each sample. For an explanation of the various sample types and the requirements for collecting and submitting each particular type, refer to Table 3-1.

**Table 3-1. Sample Types and CLP Submission Requirements**

<b>Sample Type</b>	<b>Purpose</b>	<b>Collection<sup>1</sup></b>	<b>CLP Sample Number</b>
Field Duplicate	To check reproducibility of laboratory and field procedures. To indicate non-homogeneity.	Collect from areas that are known or suspected to be contaminated.  Collect one sample per week or 10% (Regions may vary) of all field samples per matrix, whichever is greater.	Assign two separate (unique) CLP Sample numbers (i.e., one number to the field sample and one to the duplicate).  Submit blind to the laboratory.
Field Blank	To check cross-contamination during sample collection, preservation, and shipment, as well as in the laboratory. Also to check sample containers and preservatives.	Collect for each group of samples of similar matrix with the frequency specified in the QAPP and Sampling Plan.  Organics - Use water (demonstrated to be free of the contaminants of concern).  Inorganics - Use metal-free (deionized or distilled) water or a single clean wipe or filter.	Assign separate CLP Sample numbers to the field blanks.
Temperature Blank	To provide an accurate measurement of field sample upon arrival to the laboratory. Also to establish whether the temperature range has been maintained while in transit.	Collect for each shipping container with the frequency specified in the QAPP and Sampling Plan.	Shipped together with samples from the field to the laboratory.
Trip Blank (Volatile Organic Analysis Only)	To check contamination of VOA samples during handling, storage, and shipment from field to laboratory.	Prior to going into the field, prepare and seal one trip blank sample per shipment per matrix. Trip blanks should be matched with respect to matrix and volume of the preservatives used. Before going into the field prepare trip blank samples with the same laboratory grade methanol and sodium bisulfate solution or reagent water used for field sampling. Carry each through the same sampling and handling protocols used for field samples. Aqueous trip blank samples should be prepared using water demonstrated to be free of the contaminants of concern (deionized water is appropriate).  Place one trip blank sample for each matrix in each cooler used to ship VOA samples.	Assign separate CLP Sample numbers to the trip blanks.
Equipment Blank or Rinsate Blank	To check field decontamination procedures.	Collect when sampling equipment is decontaminated and reused in the field or when a sample collection vessel (bailer or beaker) will be used. Use blank water (water demonstrated to be organic-free, deionized or distilled for inorganics) and rinse water into the sample containers.	Assign separate CLP Sample numbers to the equipment blanks.
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) (Organic Analysis Only)	To check accuracy and precision of organic analyses in specific sample matrices.	Collect from areas that are known or suspected to be contaminated. For smaller sampling events (i.e., 20 samples or less), MS/MSD additional volume should be collected in the first round of sampling and included in the first shipment of samples to the laboratory.  Collect triple volume <sup>2</sup> for aqueous samples and soil VOA samples designated for MS/MSD analyses. Collect double volume for soil samples requiring SVOA, Pesticide, and/or Aroclor analysis and MS/MSD. See Table 3-2 and Appendix B for VOA collection volumes.	Assign the same CLP Sample number to the field sample and the extra volume for MS/MSD.  Identify the sample designated for MS/MSD on the TR/COC record.
Matrix Spike (MS) and Duplicate (Inorganic Analysis Only)	To check accuracy and precision of inorganic analyses in specific sample matrices.	Collect from areas that are known or suspected to be contaminated. For smaller sampling events (i.e., 20 samples or less), Matrix Spike and Duplicates should be collected in the first round of sampling and included in the first shipment of samples to the laboratory.  Additional sample volume may be required for inorganic analysis. <sup>3</sup>	Assign the same CLP Sample number to the field sample and extra volume (if collected).  Identify the sample(s) designated for Matrix Spike and Duplicates on the TR/COC record.

**Table 3-1. Sample Types and CLP Submission Requirements**

Sample Type	Purpose	Collection <sup>1</sup>	CLP Sample Number
PE Samples	Specially-prepared QC samples used to evaluate a laboratory's analytical proficiency.	The PE samples contain analytes with concentrations unknown to the laboratory. Designated Regional or authorized personnel (depending on Regional policy) arrange for Case-specific CLP PE samples to be prepared and shipped by the QATS contractor. The PE samples can be shipped to the site, or shipped per Regional direction. QATS provides the appropriate preparation instructions and chain-of-custody materials.	Samplers must order PE samples and ship them to the laboratory if required by the Region.

<sup>1</sup> Consult Regional or Project Manager Guidance for field QC sample frequencies; laboratory QC sample frequencies are generally fixed in the laboratory subcontracts or specified in analytical methods.

<sup>2</sup> An aqueous sample for SVOA analysis would require the field sampler to collect at least 2 L of field samples and at least 2 L each for the MS and MSD samples for a total volume of 6 L. If Pesticide or Aroclor MS/MSD analyses are required for the same sample, an additional 6 L must be collected for each analysis method. Collect additional volume for MS/MSD samples to allow for sufficient volume for these analyses in the event sample volume is lost as a result of samples breaking, leaking, or laboratory accidents.

<sup>3</sup> Double volume should be sent for inorganic aqueous MS and Duplicate samples to allow for sufficient volume for these analyses in the event sample volume is lost as a result of samples breaking, leaking, re-extraction/redigestion, reanalysis, or laboratory accidents. Additional soil volume is not necessary for inorganic samples.

### 3.1.1.1 Collect Field QC Samples

Field QC samples are designed to assess variability of the media being sampled and to detect contamination and sampling error in the field. The types of field QC samples that are generally collected include field duplicates and field blanks (such as equipment, trip, or rinse blanks). Generally, field duplicate samples should remain “blind” to the laboratory (i.e., they should have separate CLP Sample numbers).

### 3.1.1.2 Collect Laboratory QC Samples

A laboratory QC sample is an additional analysis of a field sample, as required by the laboratory's contract. There are three types of laboratory QC samples:

- MS (for organic and inorganic samples)
- MSD (for organic samples only)
- Duplicates (for inorganic samples only)



Samplers should obtain Regional guidance regarding the collection of laboratory QC samples (especially for organics analyses). These are not required for wipes and air filter samples.

Samplers should select one sample per matrix per 20 samples as a “laboratory QC” sample. Designated organic laboratory QC samples should be noted on the Organic TR/COC record. Designated inorganic laboratory QC samples should be noted on the Inorganic TR/COC record. The sample(s) designated for laboratory QC should be noted in both “QC Type” column and the “Sample(s) to be used for laboratory QC” fields on the Organic and Inorganic TR/COC records.

The sampler should select a field sample as the laboratory QC sample. QC samples should be sent in the same cooler as the field samples when possible. If the sampler fails to designate a laboratory QC, this may cause a delay in the analyses of the samples.



In the event of multiple sample shipments during a sampling event, it is recommended that the sampler submit laboratory QC samples in the first sample shipment, and as necessary in subsequent shipments to meet laboratory contract requirements.

### 3.1.2 Meet Volume, Preservation, and Holding Time Requirements

Samplers should refer to their project plans to obtain the specific sample volumes to be collected, the preservation needed for those samples, and the technical holding times under which they must submit samples to the scheduled CLP laboratory. Sample collection parameters (including sample volumes, preservatives, and technical holding times) for organic collection and analysis are listed in Tables 3-2 and 3-3. Sample collection parameters for inorganic analysis and collection are listed in Table 3-4 and 3-5.

#### 3.1.2.1 Collect Sample Volume

Collecting sufficient sample volume is critical. There must be sufficient physical sample volume for the analysis of all required parameters and completion of all QC determinations. The type of analytical procedure(s) to be performed will often dictate the sample volume to collect. For example, each water sample collected for VOA analysis by CLP SOW SOM01.X requires a minimum of three vials, each filled completely to a 40 mL capacity. See Appendix C for information regarding the collection of VOAs in water. When sampling for VOAs in soils, samplers must use SW-846 Method 5035A guidelines included in Appendix B. It is extremely important that samplers refer to their specific project plans to identify and collect the correct sample volume during each sampling event.



If a modified analysis requesting tissue samples required processing or homogenizing, it should be performed at a sample processing facility under clean room condition to reduce potential contamination. Tissue samples should be packed and cooled on ice immediately. Tissue samples should never be sent on Friday for Monday delivery.

#### 3.1.2.2 Preserve Samples

Degradation of some contaminants may occur naturally (e.g., VOAs). The sampler must chemically preserve some water samples for certain analytes before shipping them to the laboratory. Any visible reaction between the sample and added chemical preservative should be noted in the field record.

The sampler should preserve and immediately cool all water samples to 4°C ( $\pm 2^\circ\text{C}$ ) upon collection and samples should remain cooled until the time of analysis (do not freeze water samples). Preservation techniques vary among Regions so the sampler should obtain Region-specific instructions and review the appropriate project plans and SOPs. See Appendix C for information regarding the collection of VOAs in water.

#### 3.1.2.3 Ship within Holding Times

**Samplers should ship samples to scheduled CLP laboratories as soon as possible after collection.** Daily shipment of samples to CLP laboratories is preferred whenever possible. If samples cannot be shipped on a daily basis, they must be properly preserved and maintained to meet CLP-specified temperatures, holding times, and custody requirements.

The technical holding times are the maximum time allowed between a sample collection and the completion of the sample extraction and/or analysis. In contrast, contractual holding times are the maximum lengths of time that the CLP laboratory can hold the sample prior to extraction and/or analysis. The contractual holding time is the elapsed time expressed in days from the date of receipt of the sample by the laboratory until the date of its analysis, as described in the appropriate CLP SOW. Contractual holding times are generally set to be two days less than the technical holding times to allow for sample packing and shipping.



If samplers are shipping samples after 5:00 PM ET, they must notify the RSCC (or designee) and SMO by 8:00 AM ET on the following business day. When making a Saturday delivery, samplers must notify the RSCC (or designee) and SMO as soon as possible so that SMO will receive the delivery information by 3:00 PM ET on the Friday prior to delivery.

**Table 3-2. Sample Collection Requirements for CLP SOW SOM01.X (VOAs)**

Matrix	Sample Type	Container Type <sup>1</sup>	Minimum Number of Containers Needed				Minimum Volume/Mass <sup>2</sup>	Important Notes	Preservative <sup>3</sup>	Technical Holding Time <sup>4</sup>
			with Water	Dry	% Moisture	TOTAL				
Water	Samples Only	40 mL amber glass vial, 24 mm neck finish. See Table 2-2, Reference Number 1.	-	-	-	3	Fill to capacity	Containers/vials must be filled to capacity with no headspace or air bubbles. Refer to Appendix C for samples requiring QC analyses.	Preserve to a pH of 2 with HCl and cool to 4°C (±2°C) immediately after collection. DO NOT FREEZE water samples.	14 days
	Samples with SIM		-	-	-	5				
	Samples with MS/MSD		-	-	-	9				
Soil/ Sediment	Samples Only	<b>OPTION 1</b> Closed-system 40 mL amber glass vial containing magnetic stirrer, 24 mm neck finish. See Table 2-2, Reference Number 1.	-	3	1	4	5g	Place samples on side prior to being iced. Refer to Appendix B for samples requiring QC analyses.	Frozen to (-□7° C to -□15° C) <b>OR</b> Iced to 4° (±2°C).	14 days <b>OR</b> 48 hours (unpreserved) <sup>5</sup>
	Samples with MS/MSD		-	9	1	10				
	Samples Only	<b>OPTION 2</b> Closed-system 40 mL amber glass vial containing magnetic stirrer, 24 mm neck finish and 5 mL water. See Table 2-2, Reference Number 1.	2	1	1	4	5 g	Place samples on side prior to being iced. Refer to Appendix B for samples requiring QC analyses.	Frozen to (-□7° C to -□15° C) <b>OR</b> Iced to 4° (±2°C).	14 days <b>OR</b> 48 hours (unpreserved) <sup>5</sup>
	Samples with MS/MSD		6	1	1	8				
	Samples Only	<b>OPTION 3</b> Coring tool used as a transport device. See Table 2-2, Reference Number 7.	-	3	1	4	5g	Refer to Appendix B for samples requiring QC analysis. Place samples on side prior to being iced.	Frozen to (-□7° C to -□15° C) <b>OR</b> Iced to 4° (±2°C).	14 days <b>OR</b> 48 hours (unpreserved) <sup>5</sup>
	Samples with MS/MSD		-	9	1	10				

**Notes**

<sup>1</sup> Vials for soil analysis are typically pre-labeled and tared vials for water analysis are not pre-labeled or tared.

<sup>2</sup> Minimum volume/mass to be collected in order to ensure sample analysis can be performed. Collect additional volume for MS/MSD samples to allow for sufficient volume for these analyses in the event sample volume is lost as a result of samples breaking, leaking, or laboratory accidents.

<sup>3</sup> Check Regional guidance regarding use of acid as a preservative of samples that may contain carbonates, residual chlorine, and other oxidants.

<sup>4</sup> Technical holding time is calculated from the time of sample collection to sample extraction, and determined as 14 days for preserved (frozen or iced) samples and 48 hours for non-preserved (iced) samples. Sample extracts are to be analyzed within 40 days of extraction. It is recommended that samplers ship samples to the laboratory on the same day that they are collected, or as soon as possible thereafter.

<sup>5</sup> Unpreserved soil samples can be frozen or iced at the time of receipt by the laboratory to increase holding time.

**Table 3-3. Sample Collection Requirements for CLP SOW SOM01.X (SVOAs, Pesticides and Aroclors)**

Analysis	Matrix	Sample Type	Container Type	Minimum Volume/Mass <sup>1</sup>	Important Notes	Preservative/Collection	Technical Holding Time <sup>2</sup>
SVOAs	Water <sup>3</sup>	Samples Only	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	2 L	If amber containers are not available, the samples should be protected from light.	Cool all samples to 4°C (±2°C) immediately after collection. DO NOT FREEZE water samples.	7 days
		Samples with MS/MSD	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	6 L			
	Soil/ Sediment <sup>4</sup>	Samples Only	One 8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish or two 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	150 grams		Cool all samples to 4°C (±2°C) immediately after collection.	14 days
		Samples with MS/MSD	Two 8 oz short, wide mouth, straight-sided, glass jars, 70 mm neck finish or 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	300 grams			
SVOA SIM	Water <sup>3</sup>	Samples Only	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	2L	If amber containers are not available, the samples should be protected from light.	Cool all samples to 4°C (±2°C) immediately after collection. DO NOT FREEZE water samples.	7 days
		Samples with MS/MSD	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	10L			
	Soil/ Sediment <sup>4</sup>	Samples Only	One 8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish or two 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	150 grams		Cool all samples to 4°C (±2°C) immediately after collection.	14 days
		Samples with MS/MSD	Two 8 oz short, wide mouth, straight-sided, glass jars, 70 mm neck finish or four 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	300 grams			

**Table 3-3. Sample Collection Requirements for CLP SOW SOM01.X (SVOAs, Pesticides and Aroclors) (Continued)**

Analysis	Matrix	Sample Type	Container Type	Minimum Volume/Mass <sup>1</sup>	Important Notes	Preservative/Collection	Technical Holding Time <sup>2</sup>
Pesticides	Water <sup>3</sup>	Samples Only	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	2 L	If amber containers are not available, the samples should be protected from light.	Cool all samples to 4°C (±2°C) immediately after collection. DO NOT FREEZE water samples.	7 days
		Samples with MS/MSD	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	6 L			
	Soil/Sediment <sup>4</sup>	Samples Only	One 8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish or four 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	150 grams		Cool all samples to 4°C (±2°C) immediately after collection.	14 days
		Samples with MS/MSD	Two 8 oz short, wide mouth, straight-sided, glass jars, 70 mm neck finish or four 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	300 grams			
Aroclors	Water <sup>3</sup>	Samples Only	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	2 L	If amber containers are not available, the samples should be protected from light.	Cool all samples to 4°C (±2°C) immediately after collection. DO NOT FREEZE water samples.	7 days
		Samples with MS/MSD	1 L amber round glass bottle, 33 mm pour-out neck finish. See Table 2-2, Reference Number 5.	6 L			
	Soil/Sediment <sup>4</sup>	Samples Only	One 8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish or 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	150 grams		Cool all samples to 4°C (±2°C) immediately after collection.	14 days
		Samples with MS/MSD	Two 8 oz short, wide mouth, straight-sided, glass jars, 70 mm neck finish or four 4 oz tall, wide mouth, straight-sided, glass jar, 48 mm neck finish. See Table 2-2, Reference Numbers 3 and 4.	300 grams			

**Notes**

<sup>1</sup> Minimum volume/mass to be collected in order to ensure sample analysis can be performed.

<sup>2</sup> This technical holding time is calculated from the time of sample collection to sample extraction. Sample extracts are to be analyzed within 40 days of extraction. It is recommended that samplers ship samples to the laboratory on the same day that they are collected, or as soon as possible thereafter.

<sup>3</sup> An aqueous sample for SVOA analysis would require the field sampler to collect at least 2 L of field samples and at least 2 L each for the MS and MSD samples for a total volume of 6 L. If Pesticide or Aroclor MS/MSD analyses are required for the same sample, an additional 6 L must be collected for each analysis method. Collect additional volume for MS/MSD samples to allow for sufficient volume for these analyses in the event sample volume is lost as a result of samples breaking, leaking, or laboratory accidents.

<sup>4</sup> If one or two extractable analyses are required for soil/sediment, only a single 8 oz. jar is required. If three extractable analyses are required, two 8 oz. jars are required. The number of jars should be doubled if MS/MSD is required.

**Table 3-4. Sample Collection Requirements for CLP SOW ISM01.X**

Analysis	Matrix	Sample Type	Container Type	Minimum Volume/ Mass <sup>1</sup>	Important Notes	Preservative/ Collection <sup>2</sup>	Technical Holding Time <sup>3</sup>
Metals/ICP-AES, Metals/ICP-MS, and/or Mercury by CVAA	Water	Samples Only	1 L high density polyethylene, cylinder-round bottle, 28 mm neck finish. See Table 2-2, Reference Number 2.	1L	DO NOT FREEZE water samples.	Acidify to pH < 2 with HNO <sub>3</sub> and cool to 4°C (±2°C) immediately after collection. <sup>4</sup>	6 months for all metals except Mercury (28 days)
		Samples with MS/Duplicate		2L			
	Soil/ Sediment <sup>5</sup>	Samples Only	One 8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish. See Table 2-2, Reference Number 3.	Fill to capacity		Cool to 4°C (±2°C) immediately after collection.	6 months
		Samples with MS/Duplicate					
Metals/ICP-AES <sup>6</sup>	Wipe		1 qt polymer zip-top bag. See Table 2-2, Reference Number 9.	N/A		Store at room temperature.	6 months
	Filter		Filter cassette (25 or 37 mm) as transport device. See Table 2-2, Reference Number 10.	N/A		Store at room temperature.	6 months
Cyanide/ Spectrophotometric Determination	Water	Samples Only	1 L high density polyethylene, cylinder-round bottle, 28 mm neck finish. See Table 2-2, Reference Number 2.	1L	DO NOT FREEZE water samples.	To neutralize residual chlorine, add 0.6 g ascorbic acid for each liter of sample collected, immediately upon collection. <sup>7</sup>  Add NaOH until pH >12 and cool to 4°C (±2°C) immediately after collection.	14 days
		Sample with MS/Duplicate		2L			
	Soil/ Sediment <sup>5</sup>	Samples Only	One 8 oz short, wide mouth, straight-sided, glass jar, 70 mm neck finish. See Table 2-2, Reference Number 3.	Fill to capacity		Cool to 4°C (±2°C) immediately after collection.	14 days
		Samples with MS/Duplicate					

**Notes**

- <sup>1</sup> Minimum volume/mass to be collected in order to ensure sample analysis can be performed.
- <sup>2</sup> Check Regional guidance regarding use of acid as a preservative of samples that may contain carbonates, residual chlorine, and other oxidants.
- <sup>3</sup> This technical holding time is calculated from the time of sample collection to sample extraction. Sample extracts are to be analyzed within 40 days of extraction.
- <sup>4</sup> Water samples collected for total metal and filtered metal analyses from the same sampling location must be assigned separate (unique) CLP Sample Numbers.
- <sup>5</sup> Only one 8 oz. jar is needed for soil/sediment when all metals (including mercury) and cyanide analyses are required for soil/sediment samples.
- <sup>6</sup> Filter method is intended for 25 mm or 37 mm mixed cellulose ester (MCE) filters in cassettes. Wipe materials have varied from laboratory tissues (e.g., Kimwipes®) to pre-moistened "baby wipes" from the nearest store.
- <sup>7</sup> Samplers must test for sulfide and oxidizing agents (e.g., chlorine) in aqueous samples in the field upon collection. Please refer to the SAP and Appendix C for guidance. Sulfides adversely affect the analytical procedure. The following can be done to test for and neutralize sulfides. Place a drop of the sample on lead acetate test paper to detect the presence of sulfides. If sulfides are present, treat 25 mL more of the sample than that required for the cyanide determination with powdered cadmium carbonate or lead carbonate. Yellow cadmium sulfide or black lead sulfide precipitates if the sample contains sulfide. Repeat this operation until a drop of the treated sample solution does not darken the lead acetate test paper. Filter the solution through a dry filter paper into a dry beaker, and from the filtrate measure the sample to be used for analysis. Avoid a large excess of cadmium carbonate and a long contact time in order to minimize a loss by complication or occlusion of cyanide on the precipitated material. Sulfide removal should be performed in the field, if practical, prior to pH adjustment with NaOH.

## 3.2 Complete Documentation

Samplers must complete all documentation, including the recording of the CLP Sample Number on the sample container or bottle, sample labels, and chain-of-custody seals (as appropriate), the TR/COC record, and the field operations records (as necessary).

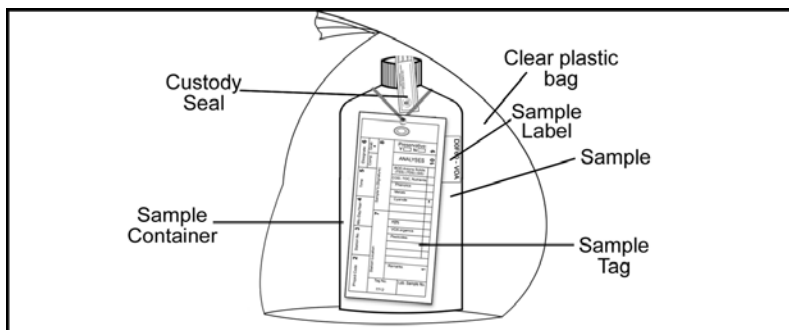
Samplers should use the FORMS II Lite or Scribe software to create and print sample labels and the TR/COC record. Samplers can create and print out two copies of a sample label and attach one to the sample container or bottle, and place the other on the sample tag that may be attached to the sample container or bottle.

Samplers are expected to review their project plans to determine what documentation they are expected to include during a sampling event. It is highly recommended that samplers provide documentation, even if the Region does not require it.



Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional USEPA laboratory. Then the Region copy of the TR/COC record shall be sent to the USEPA laboratory.

An example of a packaged sample is shown in Figure 3-1. A description of each type of documentation and instructions for accurate completion are included in the following sections.



**Figure 3-1. Packaged Sample with Identification and Chain-of-Custody Documentation (Excluding TR/COC Record)**

### 3.2.1 Identify a Sample with a CLP Sample Number and SMO-assigned CLP Case Number

The analysis method, CLP Sample number, and SMO-assigned CLP Case number **must** be recorded on each sample taken during a sampling event (see Section 1.4.3). Samplers record these numbers on the sample tag, bottle or container label using permanent ink. The numbers must also be recorded on the sample tag, if required.



Filtered metal samples and total metal samples taken from the same sampling location cannot have the same CLP Sample Number because two different sets of data will be generated. Water samples collected for total metal and filtered metal analyses from the same sampling location must be assigned separate (unique) CLP Sample numbers.

### 3.2.2 Complete TR/COC Records

A Traffic Report is used as physical evidence of sample custody and as a permanent record for each sample collected. A chain-of-custody record documents the exchange and transportation of samples from the field to the laboratory.

ASB requires samplers to use the FORMS II Lite or Scribe software to create documentation for all CLP sampling efforts. For assistance with obtaining or using the FORMS II Lite software, please contact the FORMS II Lite Help Desk at 703-818-4200 from 9:00 AM - 5:00 PM ET. For assistance with obtaining

or using the Scribe software, please contact ERT Software Support Help Desk at 800-999-6990 from 9:00 AM - 5:00 PM ET.

To meet CLP sample documentation and chain-of-custody requirements, the sampler must attach a separate TR/COC record to each cooler they ship. The TR/COC record must document each sample within the cooler. TR/COC records should be separated and shipped in the coolers with the samples listed on them. Do not ship samples in a cooler without the corresponding TR/COC record. This practice maintains the chain-of-custody for all samples in case of incorrect shipment.

If more than one TR/COC record is used for the samples within one cooler, all of the records must have complete header information and original signatures. Samplers are responsible for the care and custody of samples from the time of collection to the time of shipment to the laboratories for analysis. A sample is considered under custody if:

- It is in possession or in view after being in possession
- It was in possession and then secured or sealed to prevent tampering
- It was in possession when placed in a secured area

Each time the custody of samples is turned over to another person, the TR/COC record must be signed off by the former custodian and accepted by the new custodian. Samplers are, therefore, responsible for properly completing any forms or other Region-required documentation used to establish the chain-of-custody for each sample during a sampling event.

### **3.2.2.1 Complete a TR/COC Record Using the FORMS II Lite Software**

Once the sampler inputs sample collection information into FORMS II Lite, a TR/COC record will be generated electronically. The software automatically displays only the information to be entered by the sampler. FORMS II Lite then generates a laboratory and a Regional copy of the TR/COC record (see Figures 3-2 through 3-5). The sampler can print out multiple copies of the TR/COC record as necessary. The sampler must sign and submit original copies of the TR/COC record as appropriate.

An electronic TR/COC record created using the FORMS II Lite software contains basic header information; however, the sampler can also include some additional detailed information. For example, not only is the sample matrix listed on the electronic TR/COC record, but the name of the sampler taking the sample can also be entered. Samplers should note that certain information will not appear on the electronic TR/COC record (e.g., matrix and preservative descriptions).

### **3.2.2.2 Complete a COC Record Using the Scribe Software**

Once the sampler inputs sample collection information into Scribe, a Chain-of-Custody (COC) record will be generated electronically. The software automatically displays only the information to be entered by the sampler. Scribe then generates a laboratory and a Regional copy of the COC record (see Figures 3-6 through 3-9). The sampler can print out multiple copies of the COC record as necessary. The sampler must sign and submit original copies of the COC record as appropriate.

An electronic COC record created using the Scribe software contains basic header information; however, the sampler can also include some additional detailed information. For example, not only is the sample matrix listed on the electronic COC record, but the name of the sampler taking the sample can also be entered. Samplers should note that certain information will not appear on the electronic COC record (e.g., matrix and preservative descriptions).

### **3.2.2.3 Indicate Modified Analysis on FORMS II Lite TR/COC Records**

When completing a TR/COC record using FORMS II Lite, the sampler should identify any samples that will be analyzed using a CLP Modified Analysis. Samplers should indicate use of a Modified Analysis by creating a new analysis within the FORMS II Lite Wizard or through the FORMS II Lite reference tables. This newly-created analysis should contain the Modification Reference Number within the name assigned to the analysis. For example, if a Region submits a Modified Analysis for an additional analyte, and SMO assigns the Modification Reference Number 1301.0, the FORMS II Lite analysis could be named "VOA

by M.A. 1301.0." The associated abbreviation for this analysis could be "VOA M.A." If you have any questions regarding identification of Modified Analysis using FORMS II Lite, please contact the FORMS II Lite Help Desk at 703-818-4200 from 9:00 AM - 5:00 PM ET.

#### **3.2.2.4 Indicate Modified Analysis on Scribe COC Records**

When completing a COC record using Scribe, the sampler should identify any samples that will be analyzed using a CLP Modified Analysis. Samplers should indicate use of a Modified Analysis (MA) by creating a new analysis within the Scribe Analyses table or at the time of entering the Analyses for the sample. This newly-created analysis should contain the Modification Reference Number within the name assigned to the analysis. For example, if a Region submits a MA for an additional analyte, and SMO assigns the Modification Reference Number 1301.0, the Scribe Analyses could be named "CLP VOA by M.A. 1301.0." The associated abbreviation for this analysis could be "VOA M.A." If you have any questions regarding identification of Modified Analysis using Scribe, please contact the ERT Software Support Help Desk at 800-999-6990.

#### **3.2.2.5 Make Manual Edits to Printed FORMS II Lite TR/COC Records**

If a FORMS II Lite TR/COC Record has been printed and deletions or edits need to be made by the sampler, the following procedures must be followed:

- If corrections occur after shipment, adhere to Region-specific procedures and guidelines on handling hard copy TR/COC records.
- If making a deletion, manually cross out the information to be disregarded from the TR/COC record, initial and date the deletion.
- If making an addition, enter the new information and initial, sign and date the newly added information.



All modifications made on a printed TR/COC record must be initialed and dated.

#### **3.2.2.6 Make Manual Edits to Printed Scribe COC Records**

If a Scribe COC Record has been printed and deletions or edits need to be made by the sampler, the following procedures must be followed:

- If corrections occur after shipment, adhere to Region-specific procedures and guidelines on handling hard copy COC records.
- If making a deletion, correct the deletion in Scribe and reprint the COC record. Discard the original.
- If making an addition, enter the new information in Scribe and reprint the COC record. Discard the original.



**USEPA Contract Laboratory Program**  
**Organic Traffic Report & Chain of Custody Record**

**Case No:** 39400  
**DAS No:** DAS9000  
**SDG No:** L

<b>Date Shipped:</b> 11/9/2009 <b>Carrier Name:</b> FedEx <b>Airbill:</b> 987654321123456789 <b>Shipped to:</b> Organic Laboratory 1234 Smith Drive Anywhere AR 123456 (123) 456-7890	<b>Chain of Custody Record</b>	<b>Sampler Signature:</b>	<b>For Lab Use Only</b>
	<b>Relinquished By</b> (Date / Time)	<b>Received By</b> (Date / Time)	<b>Lab Contract No:</b>
	1		<b>Unit Price:</b>
	2		<b>Transfer To:</b>
	3		<b>Lab Contract No:</b>
4		<b>Unit Price:</b>	

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		INORGANIC SAMPLE No.	FOR LAB USE ONLY Sample Condition On Receipt
C3TK1	Surface Water/ BOBBY SAMPLER	/G	1310.0 (21), BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119002, 6-2119003, 6-2119004 (Ice Only), 6-2119005 (Ice Only), 6-2119006, 6-2119008 (6)	LOCATION ONE	S: 11/6/2009	14:57	MC3TK1	
C3TK2	Surface Water/ DAN SAMPLER	/G	BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119010, 6-2119011, 6-2119012 (Ice Only), 6-2119013 (Ice Only), 6-2119014 (5)	LOCATION TWO	S: 11/9/2009	8:13	MC3TK2	
C3TK4	Surface Water/ DAN SAMPLER	/G	1310.0 (21)	6-2119026 (1)	LOCATION THREE	S: 11/9/2009	8:14	MC3TK4	
C3TK5	Surface Water/ JOHN SAMPLER	/G	BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119027 (Ice Only), 6-2119028 (Ice Only) (5)	LOCATION FOUR	S: 11/9/2009	8:14		
C3TK6	Surface Water/ JOHN SAMPLER	/G	1310.0 (21), BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119033, 6-2119034, 6-2119035 (Ice Only), 6-2119036 (Ice Only), 6-2119037, 6-2119039 (6)	LOCATION FIVE	S: 11/9/2009	8:14	MC3TK6	
C3TK7	Surface Water/ JOHN SAMPLER	/G	1310.0 (21), BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119041, 6-2119042, 6-2119043 (Ice Only), 6-2119044 (Ice Only), 6-2119045, 6-2119047 (6)	LOCATION SIX	S: 11/9/2009	8:14	MC3TK7	

<b>Shipment for Case Complete?</b> N	<b>Sample(s) to be used for laboratory QC:</b> C3TK1	<b>Additional Sampler Signature(s):</b>	<b>Cooler Temperature Upon Receipt:</b>	<b>Chain of Custody Seal Number:</b>
<b>Analysis Key:</b>	<b>Concentration:</b> L = Low, M = Low/Medium, H = High	<b>Type/Designate:</b> Composite = C, Grab = G	<b>Custody Seal Intact?</b> <input type="checkbox"/>	<b>Shipment Iced?</b> <input type="checkbox"/>
1310.0 = VOA by MA 1310.0, BNA = CLP TCL Semivolatiles, CLP ARO = CLP TCL PCB (Aroclors), CLP PEST = CLP TCL Pesticides, VOA = CLP TCL Volatiles				

**TR Number:** 3-043013577-050310-0004

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

**LABORATORY COPY**

F2V5.1.047 Page 1 of 1

**Figure 3-2. FORMS II Lite Organic Traffic Report & Chain of Custody Record (Laboratory Copy)**



**USEPA Contract Laboratory Program  
Inorganic Traffic Report & Chain of Custody Record**

Case No: **39400**  
DAS No: DAS9000  
SDG No: **L**

<b>Date Shipped:</b> 11/9/2009 <b>Carrier Name:</b> FedEx <b>Airbill:</b> 123456789987654321 <b>Shipped to:</b> Inorganic Laboratory 1234 Watson Drive Anywhere NC 123456 (123) 456-7892	<b>Chain of Custody Record</b>		<b>Sampler Signature:</b>	<b>For Lab Use Only</b>  <b>Lab Contract No:</b> _____ <b>Unit Price:</b> _____ <b>Transfer To:</b> _____ <b>Lab Contract No:</b> _____ <b>Unit Price:</b> _____	
	<b>Relinquished By</b>	<b>(Date / Time)</b>	<b>Received By</b>		<b>(Date / Time)</b>
	1.				
	2.				
	3.				
4.					

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	FOR LAB USE ONLY Sample Condition On Receipt
MC3TK1	Surface Water/ BOBBY SAMPLER	/G	1705.0 (21), AES 1-4 (14)	6-2119001, 6-2119007 (2)	LOCATION ONE	S: 11/6/2009 14:57	C3TK1	
MC3TK2	Surface Water/ DAN SAMPLER	/G	AES 1-4 (14)	6-2119009 (1)	LOCATION TWO	S: 11/9/2009 8:13	C3TK2	
MC3TK4	Surface Water/ DAN SAMPLER	/G	1705.0 (21)	6-2119025 (1)	LOCATION THREE	S: 11/9/2009 8:14	C3TK4	
MC3TK6	Surface Water/ JOHN SAMPLER	/G	1705.0 (21), AES 1-4 (14)	6-2119032, 6-2119038 (2)	LOCATION FIVE	S: 11/9/2009 8:14	C3TK6	
MC3TK7	Surface Water/ JOHN SAMPLER	/G	1705.0 (21), AES 1-4 (14)	6-2119040, 6-2119046 (2)	LOCATION SIX	S: 11/9/2009 8:14	C3TK7	

<b>Shipment for Case Complete?</b> Y	<b>Sample(s) to be used for laboratory QC:</b> MC3TK1	<b>Additional Sampler Signature(s):</b>	<b>Cooler Temperature Upon Receipt:</b>	<b>Chain of Custody Seal Number:</b>	
<b>Analysis Key:</b>	<b>Concentration:</b> L = Low, M = Low/Medium, H = High	<b>Type/Designate:</b> Composite = C, Grab = G		<b>Custody Seal Intact?</b> ____	<b>Shipment Iced?</b> ____
1705.0 = TCLP Metals and Hg by 1705.0, AES 1-4 = AES-Ba, Ca, Cr, Al					

TR Number: **3-043013577-050310-0003**

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

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F2V5.1.047 Page 1 of 1

Figure 3-3. FORMS II Lite Inorganic Traffic Report & Chain of Custody Record (Laboratory Copy)

Case No: 39400  
DAS No: DAS9000

R

Region: 3	Date Shipped: 11/9/2009	<b>Chain of Custody Record</b> <table border="1"> <tr> <th>Relinquished By</th> <th>(Date / Time)</th> <th>Received By</th> <th>(Date / Time)</th> </tr> <tr><td>1</td><td></td><td></td><td></td></tr> <tr><td>2</td><td></td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td></tr> </table>	Relinquished By	(Date / Time)	Received By	(Date / Time)	1				2				3				4			
Relinquished By	(Date / Time)		Received By	(Date / Time)																		
1																						
2																						
3																						
4																						
Project Code: QW-123	Carrier Name: FedEx																					
Account Code: ACCT000	Airbill: 987654321123456789																					
CERCLIS ID:	Shipped to: Organic Laboratory																					
Spill ID: ID3	1234 Smith Drive																					
Site Name/State: REAL SITE/VA	Anywhere AR 123456																					
Project Leader: DAN SAMPLER	(123) 456-7890																					
Action: Combined RI/FS																						
Sampling Co: SMITH CO.																						

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		INORGANIC SAMPLE No.	QC Type
C3TK1	Surface Water/ BOBBY SAMPLER	/G	1310.0 (21), BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119002, 6-2119003, 6-2119004 (Ice Only), 6-2119005 (Ice Only), 6-2119006, 6-2119008 (6)	LOCATION ONE	S: 11/8/2009	14:57	MC3TK1	Lab QC
C3TK2	Surface Water/ DAN SAMPLER	/G	BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119010, 6-2119011, 6-2119012 (Ice Only), 6-2119013 (Ice Only), 6-2119014 (5)	LOCATION TWO	S: 11/9/2009	8:13	MC3TK2	Trip Blank
C3TK4	Surface Water/ DAN SAMPLER	/G	1310.0 (21)	6-2119026 (1)	LOCATION THREE	S: 11/9/2009	8:14	MC3TK4	-
C3TK5	Surface Water/ JOHN SAMPLER	/G	BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119027 (Ice Only), 6-2119028 (Ice Only) (5)	LOCATION FOUR	S: 11/9/2009	8:14		Rinsate
C3TK6	Surface Water/ JOHN SAMPLER	/G	1310.0 (21), BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119033, 6-2119034, 6-2119035 (Ice Only), 6-2119036 (Ice Only), 6-2119037, 6-2119039 (6)	LOCATION FIVE	S: 11/9/2009	8:14	MC3TK6	PE
C3TK7	Surface Water/ JOHN SAMPLER	/G	1310.0 (21), BNA (14), CLP ARO (14), CLP PEST (14), VOA (14)	6-2119041, 6-2119042, 6-2119043 (Ice Only), 6-2119044 (Ice Only), 6-2119045, 6-2119047 (6)	LOCATION SIX	S: 11/9/2009	8:14	MC3TK7	Field Duplicate

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC: C3TK1	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____
1310.0 = VOA by MA 1310.0, BNA = CLP TCL Semivolatiles, CLP ARO = CLP TCL PCB (Aroclors), CLP PEST = CLP TCL Pesticides, VOA = CLP TCL Volatiles			

TR Number: 3-043013577-050310-0004

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

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Figure 3-4. FORMS II Lite Organic Traffic Report & Chain of Custody Record (Region Copy)

**EPA USEPA Contract Laboratory Program**  
**Inorganic Traffic Report & Chain of Custody Record**

Case No: **39400**  
DAS No: DAS9000

**R**

<b>Region:</b> 3 <b>Project Code:</b> QW-123 <b>Account Code:</b> ACCT000 <b>CERCLIS ID:</b> <b>Spill ID:</b> ID3 <b>Site Name/State:</b> REAL SITE/VA <b>Project Leader:</b> DAN SAMPLER <b>Action:</b> Combined RI/FS <b>Sampling Co:</b> SMITH CO.	<b>Date Shipped:</b> 11/9/2009 <b>Carrier Name:</b> FedEx <b>Airbill:</b> 123456789987654321 <b>Shipped to:</b> Inorganic Laboratory 1234 Watson Drive Anywhere NC 123456 (123) 456-7892	<b>Chain of Custody Record</b> <table border="1"> <tr> <th>Relinquished By</th> <th>(Date / Time)</th> <th>Received By</th> <th>(Date / Time)</th> </tr> <tr><td>1.</td><td></td><td></td><td></td></tr> <tr><td>2.</td><td></td><td></td><td></td></tr> <tr><td>3.</td><td></td><td></td><td></td></tr> <tr><td>4.</td><td></td><td></td><td></td></tr> </table>	Relinquished By	(Date / Time)	Received By	(Date / Time)	1.				2.				3.				4.				<b>Sampler Signature:</b>
Relinquished By	(Date / Time)	Received By	(Date / Time)																				
1.																							
2.																							
3.																							
4.																							

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		ORGANIC SAMPLE No.	QC Type
MC3TK1	Surface Water/ BOBBY SAMPLER	/G	1705.0 (21), AES 1-4 (14)	6-2119001, 6-2119007 (2)	LOCATION ONE	S: 11/6/2009	14:57	C3TK1	Lab QC
MC3TK2	Surface Water/ DAN SAMPLER	/G	AES 1-4 (14)	6-2119009 (1)	LOCATION TWO	S: 11/9/2009	8:13	C3TK2	Trip Blank
MC3TK4	Surface Water/ DAN SAMPLER	/G	1705.0 (21)	6-2119025 (1)	LOCATION THREE	S: 11/9/2009	8:14	C3TK4	--
MC3TK6	Surface Water/ JOHN SAMPLER	/G	1705.0 (21), AES 1-4 (14)	6-2119032, 6-2119038 (2)	LOCATION FIVE	S: 11/9/2009	8:14	C3TK6	PE
MC3TK7	Surface Water/ JOHN SAMPLER	/G	1705.0 (21), AES 1-4 (14)	6-2119040, 6-2119046 (2)	LOCATION SIX	S: 11/9/2009	8:14	C3TK7	Field Duplicate

<b>Shipment for Case Complete? Y</b>	<b>Sample(s) to be used for laboratory QC:</b> MC3TK1	<b>Additional Sampler Signature(s):</b>	<b>Chain of Custody Seal Number:</b>
<b>Analysis Key:</b> 1705.0 = TCLP Metals and Hg by 1705.0, AES 1-4 = AES-Ba, Ca, Cr, Al	<b>Concentration:</b> L = Low, M = Low/Medium, H = High	<b>Type/Designate:</b> Composite = C, Grab = G	<b>Shipment Iced?</b> _____

TR Number: **3-043013577-050310-0003**

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, Attn: Heather Bauer, CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

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F2V5.1.047 Page 1 of 1

**Figure 3-5. FORMS II Lite Inorganic Traffic Report & Chain of Custody Record (Region Copy)**

**USEPA CLP Organics COC (LAB COPY)**

DateShipped: 2/1/2010

CarrierName: FedEx

AirbillNo: 841821272121

**CHAIN OF CUSTODY RECORD**

Case #: 12345

Cooler #: 4

**No: 39428-01/29/10-0016**

Lab: Generic Organic Lab

Lab Contact: Mr. Lab Contact

Lab Phone: 555-555-1234

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles	Station Location	Collected	Inorganic Sample #	For Lab Use Only
B7260	Sediment/ SERAS	Grab	CLP TCL Pesticides(14), CLP TCL PCBs(14), BNA(14)	1587, 1588, 1589 (3)	ERT4-3-A	01/29/2010 11:40	MB7260	
B7261	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1594, 1596, 1597 (3)	ERT4-3-B	01/29/2010 11:40	MB7261	
B7262	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1600, 1602, 1603 (3)	ERT4-3-C	01/29/2010 11:40	MB7262	
B7263	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1606, 1608, 1609 (3)	ERT4-3-D	01/29/2010 11:40	MB7263	
B7264	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1612, 1614, 1615 (3)	ERT4-3-E	01/29/2010 11:40	MB7264	
B7265	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1618, 1620, 1621 (3)	ERT4-3-F	01/29/2010 11:40	MB7265	
B7266	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1624, 1626, 1627 (3)	ERT4-3-G	01/29/2010 11:40	MB7266	
B7267	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1630, 1632, 1633 (3)	ERT4-3-H	01/29/2010 11:40	MB7267	
B7268	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1636, 1638, 1639 (3)	ERT4-3-I	01/29/2010 11:40	MB7268	
B7269	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1642, 1644, 1645 (3)	ERT4-3-J	01/29/2010 11:40	MB7269	
B7270	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1648, 1650, 1651 (3)	ERT4-3-K	01/29/2010 11:40	MB7270	

Special Instructions:	Shipment for Case Complete? N
	Samples Transferred From Chain of Custody #
Analysis Key: BNA=CLP TCL Semivolatiles	

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

**Figure 3-6. Scribe Organics Chain of Custody Record (Laboratory Copy)**

**USEPA CLP Organics COC (REGION COPY)**

DateShipped: 2/1/2010

CarrierName: FedEx

AirbillNo: 841821272121

**CHAIN OF CUSTODY RECORD**

Scribe CLP Site

Cooler #: 4

**No: 39428-01/29/10-0016**

Lab: Generic Organic Lab

Lab Contact: Mr. Lab Contact

Lab Phone: 555-555-1234

Organic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles	Station Location	Collected	Inorganic Sample #	Sample Type
B7260	Sediment/ SERAS	Grab	CLP TCL Pesticides(14), CLP TCL PCBs(14), BNA(14)	1587, 1588, 1589 (3)	ERT4-3-A	01/29/2010 11:40	MB7260	Field Sample
B7261	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1594, 1596, 1597 (3)	ERT4-3-B	01/29/2010 11:40	MB7261	Field Sample
B7262	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1600, 1602, 1603 (3)	ERT4-3-C	01/29/2010 11:40	MB7262	Field Sample
B7263	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1606, 1608, 1609 (3)	ERT4-3-D	01/29/2010 11:40	MB7263	Field Sample
B7264	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1612, 1614, 1615 (3)	ERT4-3-E	01/29/2010 11:40	MB7264	Field Sample
B7265	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1618, 1620, 1621 (3)	ERT4-3-F	01/29/2010 11:40	MB7265	Field Sample
B7266	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1624, 1626, 1627 (3)	ERT4-3-G	01/29/2010 11:40	MB7266	Field Sample
B7267	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1630, 1632, 1633 (3)	ERT4-3-H	01/29/2010 11:40	MB7267	Field Sample
B7268	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1636, 1638, 1639 (3)	ERT4-3-I	01/29/2010 11:40	MB7268	Field Sample
B7269	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1642, 1644, 1645 (3)	ERT4-3-J	01/29/2010 11:40	MB7269	Field Sample
B7270	Sediment/ SERAS	Grab	BNA(14), CLP TCL PCBs(14), CLP TCL Pesticides(14)	1648, 1650, 1651 (3)	ERT4-3-K	01/29/2010 11:40	MB7270	Field Sample

Special Instructions:

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key: BNA=CLP TCL Semivolatiles

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

**Figure 3-7. Scribe Organics Chain of Custody Record (Region Copy)**

## USEPA CLP Inorganics COC (LAB COPY)

Date Shipped: 2/1/2010

Carrier Name: FedEx

Airbill No: 841821272187

## CHAIN OF CUSTODY RECORD

Case #: 12345

Cooler #: 2

No: 39428-01/29/10-0012

Lab: Generic Inorganic Lab

Lab Contact: Mr. Lab Contact

Lab Phone: 555-555-1234

Inorganic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles	Station Location	Collected	Organic Sample #	For Lab Use Only
MB7268	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1635 (1)	ERT4-3-I	01/29/2010 11:40	B7268	
MB7269	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1641 (1)	ERT4-3-J	01/29/2010 11:40	B7269	
MB7270	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1647 (1)	ERT4-3-K	01/29/2010 11:40	B7270	
MB7271	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1656 (1)	ERT3-3-A	01/29/2010 11:00	B7271	
MB7272	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1659 (1)	ERT3-3-B	01/29/2010 11:00	B7272	
MB7273	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1665 (1)	ERT3-3-C	01/29/2010 11:00	B7273	
MB7274	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1671 (1)	ERT3-3-D	01/29/2010 11:00	B7274	
MB7275	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1677 (1)	ERT3-3-E	01/29/2010 11:00	B7275	
MB7276	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1683 (1)	ERT3-3-F	01/29/2010 11:00	B7276	
MB7277	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1689 (1)	ERT3-3-G	01/29/2010 11:00	B7277	
MB7278	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1695 (1)	ERT3-3-H	01/29/2010 11:00	B7278	

Sample(s) to be used for Lab QC: MB7276	Shipment for Case Complete? N
	Samples Transferred From Chain of Custody #
Analysis Key: TM=CLP TAL Total Metals, CN=CLP CN	

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

Figure 3-8. Scribe Inorganics Chain of Custody Record (Laboratory Copy)

**USEPA CLP Inorganics COC (REGION COPY)**

DateShipped: 2/1/2010

CarrierName: FedEx

AirbillNo: 841821272187

**CHAIN OF CUSTODY RECORD**

Scribe CLP Site

Case #: 12345

Cooler #: 2

**No: 39428-01/29/10-0012**

Lab: Generic Inorganic Lab

Lab Contact: Mr. Lab Contact

Lab Phone: 555-555-1234

Inorganic Sample #	Matrix/Sampler	Coll. Method	Analysis/Turnaround	Tag/Preservative/Bottles	Station Location	Collected	Organic Sample #	Sample Type
MB7268	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1635 (1)	ERT4-3-I	01/29/2010 11:40	B7268	Field Sample
MB7269	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1641 (1)	ERT4-3-J	01/29/2010 11:40	B7269	Field Sample
MB7270	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1647 (1)	ERT4-3-K	01/29/2010 11:40	B7270	Field Sample
MB7271	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1656 (1)	ERT3-3-A	01/29/2010 11:00	B7271	Field Sample
MB7272	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1659 (1)	ERT3-3-B	01/29/2010 11:00	B7272	Field Sample
MB7273	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1665 (1)	ERT3-3-C	01/29/2010 11:00	B7273	Field Sample
MB7274	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1671 (1)	ERT3-3-D	01/29/2010 11:00	B7274	Field Sample
MB7275	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1677 (1)	ERT3-3-E	01/29/2010 11:00	B7275	Field Sample
MB7276	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1683 (1)	ERT3-3-F	01/29/2010 11:00	B7276	Field Sample
MB7277	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1689 (1)	ERT3-3-G	01/29/2010 11:00	B7277	Field Sample
MB7278	Sediment/ SERAS	Grab	CLP TAL/Hg/CN(14)	1695 (1)	ERT3-3-H	01/29/2010 11:00	B7278	Field Sample

Sample(s) to be used for Lab QC: MB7276	Shipment for Case Complete? N
	Samples Transferred From Chain of Custody #
Analysis Key: TM=CLP TAL Total Metals, CN=CLP CN	

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

**Figure 3-9. Scribe Inorganics Chain of Custody Record (Region Copy)**

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### 3.2.3 Complete and Attach Custody Seals

Custody seals are usually pre-printed stickers that are signed (or initialed) and dated by the sampler after sample collection and placed on sample bottles or containers and/or shipping coolers or containers (see Figure 3-10). The custody seals document the person who sealed the sample container and verify that the sample has not been tampered with. The seals must be placed such that they will break if the sample bottle or container or the shipping cooler or container is tampered with or opened after leaving custody of samplers. Custody seals can also be used to maintain custody of other items such as envelopes containing videotapes of the sample collection process. Instructions for completing and attaching a custody seal are included in Table 3-5.

The use and type of custody seals can vary by Region or collecting organization. Samplers should obtain the appropriate custody seals and specific instructions for correctly attaching them from the RSCC.



Custody seals should never be placed directly onto a coring tool used as a transport device (e.g., 5 g Sampler) or tared, 40 mL closed-system vials. The seals must be placed on the bag for the coring tool used as a transport device, or on the bag used to enclose the vials. Refer to Appendix B for details.

 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY OFFICIAL SAMPLE SEAL	SAMPLE NO.	DATE	SEAL BROKEN BY	DATE
	SIGNATURE			
	PRINT NAME AND TITLE			

**Figure 3-10. Custody Seal**

**Table 3-5. Completing and Attaching a Custody Seal**

Step	Action	Important Notes
1	Record the CLP Sample number.	The space for the CLP Sample number does not need to be completed on custody seals being placed on the opening of a cooler, only on those being placed on the opening of sample bottles or containers.
2	Record the month, day, and year of sample collection.	
3	Sign the seal in the signature field.	
4	Print your name and title in the "Print Name and Title" field.	
5	Place the custody seal over the edge of the sample bottle or container such that it will break if tampered with.	Custody seals can be placed directly on any sample container except for coring tools used as a transport device (e.g., 5 g Samplers) and tared VOA bottles. If packing coring tools used as a transport device or tared VOA bottles, place them in a clear plastic bag and place the custody seal on the outside of the bag.
6	If possible, cover the custody seal with clear plastic tape to protect it.	Take special care to not place the protective tape over the seal in such a way that it can be removed and then re-attached without signs of tampering.

### 3.2.4 Complete and Attach Sample Labels

Samplers affix sample labels to each sample container. A sample label must contain the associated CLP Sample Number (either written or pre-printed), SMO-assigned CLP Case Number, and the preservative used. It must also denote the analysis. Samplers may also include additional information such as the station location or the date/time of collection. Samplers should use FORMS II Lite or Scribe to create and print sample labels. The sampler can print two labels and attach one to the sample container or bottle, and place the other label on the sample tag that should also be attached to the sample container or bottle. The labels should then be covered with clear packaging tape to protect the label and maintain legibility. If

handwriting a sample label, the sampler should complete the label information using waterproof ink, place the label on the outside of the sample bottle or container, then cover the label with clear packaging tape to protect the label and maintain legibility (see Figure 3-1).



Do not attach labels to tared VOA sample vials. Avoid wrinkles in the tape and labels.

### 3.2.5 Complete and Attach Sample Tags

To support use of sample data in potential enforcement actions, sample characteristics other than on-site measurements (e.g., pH, temperature, conductivity) can be identified with a sample tag. Typically, site-specific information is written on the tags using waterproof ink. The use and type of sample tags may vary by Region. For each sampling event, samplers should contact the RSCC concerning the use of sample tags and the type of information required for the tags. An example of a completed sample tag is included in Figure 3-11 below:

Project Code <b>2</b> 00-030		Station No. <b>3</b> 1		Mo./Day/Year <b>4</b> 01/10/2004		Time <b>5</b> 08:45		Designate: <b>6</b>				
								Comp.	Grab <b>x</b>			
3-3001 Tag No.	Station Location <b>7</b>				Sampler's (Signature) <b>8</b> <i>John Smith</i>							
	DD001 Lab. Sample No.	Remarks: <b>1</b>	SVOA organics	Pesticides	VOA organics <b>x</b>	ABN	Cyanide	Metals	Phenolics	COD, TOC, Nutrients	BOD Anions Solids (TSS) (TDS) (SS)	ANALYSES <b>10</b>

**Figure 3-11. Completed Sample Tag**

The sampler can use FORMS II Lite or Scribe to create and print out multiple sample labels, one of which can be attached to the sample tag and then covered with clear packaging tape to protect the label and maintain legibility. If FORMS II Lite- or Scribe-created sample labels are not available, a detailed set of instructions for completing and attaching a handwritten sample tag are included in Table 3-6.

**Table 3-6. Completing and Attaching a Handwritten Sample Tag**


Step	Action
1	Under the "Remarks" heading, record the CLP Sample Number and SMO-assigned CLP Case Number in a legible manner.
2	Record the project code (e.g., Contract number, Work Assignment number, Interagency Agreement number, etc.) assigned by USEPA.
3	Enter the station number assigned by the sampling team coordinator.
4	Record the month, day, and year of sample collection.
5	Enter the military time of sample collection (e.g., 13:01 for 1:01 PM).
6	Identify the designate and place an "X" in either the composite (Comp.) or grab (Grab) sample box.
7	Record the station location.
8	Sign the sample tag in the signature area.
9	Place an "X" in the box next to Yes or No to indicate if a preservative was added to the sample.
10	Under "Analyses", place an "X" in the box next to the parameters for which the sample is to be analyzed.

**Table 3-6. Completing and Attaching a Handwritten Sample Tag**

Step	Action
11	Leave the box for "Laboratory Sample Number" blank.
12	It is recommended that the sample tag be attached to the neck of the sample bottle or container using regular string, stretch string, or wire.

### 3.3 Provide Sample Receipt

After samples have been taken from private property, the sampler should prepare a receipt for these samples and provide this receipt to the property owner. This is especially important when sampling on private property since these samples could be used during future litigation and the receipt will verify that the owner granted approval for the removal of the samples from the property. An example of a sample receipt created using FORMS II Lite is shown in Figure 3-12. An example of a sample receipt created using Scribe is shown in Figure 3-13.

 <b>EPA Region 3</b> U.S. ENVIRONMENTAL PROTECTION AGENCY		<b>RECEIPT FOR SAMPLES</b>					
<b>PROJECT NO.</b> QW-123		<b>PROJECT NAME</b>		<b>NAME &amp; LOCATION OF FACILITY/SITE</b> EXAMPLE SITE			
<b>SAMPLERS: (SIGNATURES)</b>							
STATION NO.	LOCATION/DESCRIPTION	DATE	TIME	Comp/Grab	NO. OF EPA CONTAINERS	SPLIT SAMPLE Y OR N	EPA SAMPLE TAG NO.'S
STATION ONE	LOCATION ONE	2/20/2001	15:55	G	11	Yes	112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122
STATION ONE	LOCATION TWO	2/20/2001	16:01	C	11	Yes	123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133
STATION TWO	LOCATION ONE	2/20/2001	16:02	C	11	Yes	134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144
<b>SPLIT SAMPLES TRANSFERRED BY:</b> (PRINT)		<b>DATE</b>	<b>SPLIT SAMPLES RECEIVED BY</b> <input type="checkbox"/> <b>OR DECLINED BY</b> <input type="checkbox"/> (PRINT)		<b>DATE/TIME</b>		
(SIGN)		<b>TIME</b>	(SIGN)		<b>TELEPHONE</b>		
			(TITLE)				

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**Figure 3-12. Sample Receipt Created Using the FORMS II Lite Software**

**Receipt for Samples  
Samples Residential Sampling**

Project No: 045RD20  
Samples Transferred:  
Samples Received By:

Project Name: Demo Project  
Signature:  
Signature:

WA Number: 0003  
Samples Signature:  
John Doe

Sample #	SS-0002	SS-0002	SS-0002	SS-0008
Sample Date	6/9/2010	6/9/2010	6/9/2010	6/9/2010
EventID	Front Yard Soil Sampling	Front Yard Soil Sampling	Front Yard Soil Sampling	PCB Sampling
Location	H002-F	H002-F	H002-F	H002-F
PropertyID	H002	H002	H002	H002
Matrix	Soil	Soil	Soil	Soil
Collection Method	Grab	Grab	Grab	Grab
Sample Type	Field Sample	Field Sample	Field Sample	Field Sample
Analyses	TAL-Metals-0010B	CLP TCL Volatiles	CLP TCL Semivolatiles	PCBs
Tag	A	1003	1002	A
Container	Ziploc	40 ml Vial	4oz Glass	16 oz glass
COC	Soil-001	CLP Chain-0001	CLP Chain-0001	Soil-002
Lab	ACME Environmental Lab	ABC Special Lab	ABC Special Lab	ABC Special Lab
Remarks				

Sample #	SS-0009	SS-0017	SS-0017	SS-0017
Sample Date	6/9/2010	6/9/2010	6/9/2010	6/9/2010
EventID	PCB Sampling	Back Yard Soil Sampling	Back Yard Soil Sampling	Back Yard Soil Sampling
Location	H002-R	H002-R	H002-R	H002-R
PropertyID	H002	H002	H002	H002
Matrix	Soil	Soil	Soil	Soil
Collection Method	Grab	Grab	Grab	Grab
Sample Type	Field Sample	Field Sample	Field Sample	Field Sample
Analyses	PCBs	TAL-Metals-0010B	CLP TCL Volatiles	CLP TCL Semivolatiles
Tag	A	A	1013	1012
Container	16 oz glass	Ziploc	40 ml Vial	4oz Glass
COC	Soil-002	Soil-003	9-062510-135425-0004	9-062510-135425-0004
Lab	ABC Special Lab	ACME Environmental Lab	ABC Special Lab	ABC Special Lab
Remarks				

**Figure 3-13. Sample Receipt Created Using the Scribe Software**

## 3.4 Pack and Ship Samples

Once the samples have been collected, it is very important that the sampler properly package the samples for shipment and ensure that the samples are sent to the appropriate laboratory as quickly as possible. Prompt and proper packaging of samples will:

- Protect the integrity of samples from changes in composition or concentration caused by bacterial growth or degradation from increased temperatures;
- Reduce the chance of leaking or breaking of sample containers that would result in loss of sample volume, loss of sample integrity, and exposure of personnel to toxic substances; and
- Help ensure compliance with shipping regulations.

### 3.4.1 Sample Containers

Once samples are collected, they must be stored in conditions that maintain sample integrity. All samples should be placed in shipping containers or other suitable containers with ice to reduce the temperature as soon as possible after collection.

Ideally, all samples should be shipped the day of collection for overnight delivery to the laboratory. If samples cannot be shipped on the day of collection, the sample temperature should be maintained at 4°C (±2°C) until they are shipped to the laboratory.

One CLP RAS sample may be contained in several bottles and vials. For example, one water sample may consist of all containers needed for three of the analytical analyses available under this service (i.e., SVOA analysis, Pesticide analysis, and Aroclor analysis), even though the analyses are collected in separate containers. Therefore, the analysis to be performed and the matrix type will determine the type of container(s) that will be used, as well as the volume that must be collected for that particular sample analysis.

### **3.4.2 Inventory of Samples and Documentation**

Prior to shipment, samplers should conduct an inventory of the contents of the shipping cooler or container against the corresponding TR/COC Record when packing for shipment to laboratories. An inventory will ensure that the proper number of containers have been collected for each analysis of the samples, that the required PE and QC samples and cooler temperature blanks are included, and the correct Sample Numbers and analyses have been assigned to each sample. Refer to Appendix G and Appendix H when referencing the CLP analysis codes.

### **3.4.3 Shipping Regulations**

Sample shipping personnel are legally responsible for ensuring that the sample shipment will comply with all applicable shipping regulations. If dry ice is used for shipping tissue samples, special packaging precautions are required before shipping by aircraft to comply with U.S. DOT regulations. Refer to the Code of Federal Regulations (49CFR 173.217) classified dry ice as Hazard Class 9 *UN 1845* (Hazardous Material). For example, hazardous material samples must be packaged, labeled, and shipped in compliance with all IATA Dangerous Goods regulations or DOT regulations and USEPA guidelines. Refer to Appendix B for detailed shipping guidelines when using SW-846 Method 5035A to preserve and ship samples.

### **3.4.4 Sample Packaging for Shipment**

Samplers are responsible for the proper packaging of samples for shipment. To ensure that samples are appropriately packaged (e.g., to avoid breakage and/or contamination) the sampler should consult their respective project plans to determine the proper packing and shipping procedures. The sampler must determine the sample type, pack the shipping containers correctly, include necessary paperwork, label and seal shipping containers or coolers, and ship the samples.

#### **3.4.4.1 Determine the Sample Type and Container**

Samplers should know what kinds of samples they are handling to ensure proper packaging. Samplers should refer to their appropriate project plans to determine which type of sample container should be used for each type of sample being taken during the sampling event.



Please follow Regional guidance with reference to samples containing dioxin or radioactive waste.

#### **3.4.4.2 Pack Shipping Containers**

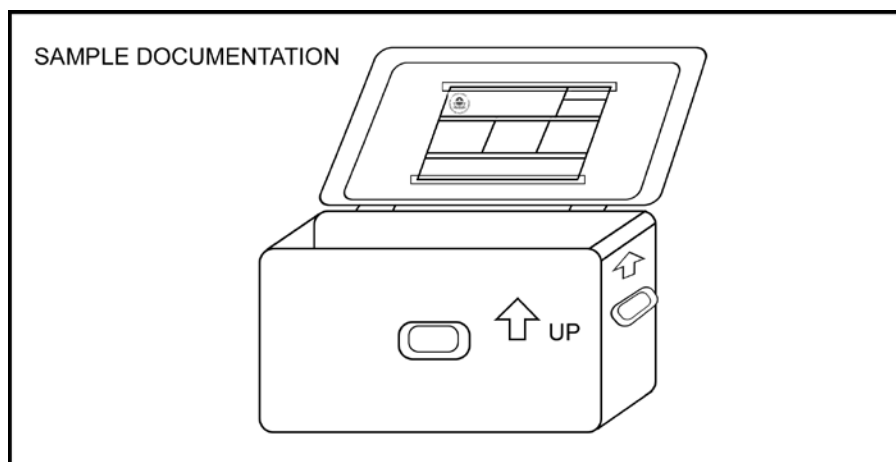
It is imperative that samples are correctly and carefully packed in shipping containers to prevent the sample containers from breaking or leaking. Samplers must prepare and pack a shipping cooler or container according to the instructions outlined in Table 3-7.

**Table 3-7. Packing Samples for Shipment**

Step	Action	Important Notes
1	Seal all drain holes in the shipping container, both inside and out, to prevent leakage in the event of sample breakage.	
2	Check all lids/caps to make sure the samples are tightly sealed and will not leak.	
3	Wipe loose soil residue from containers.	
4	Seal samples within a clear plastic bag.	Custody seals can be placed directly on any sample container except for coring tools used as a transport device (e.g., 5 g Samplers) and tared VOA bottles. If packing coring tools used as a transport device or tared VOA bottles, place them in a clear plastic bag and place the custody seal on the outside of the bag.
5	Fully chill samples to 4°C (±2°C) prior to placement within suitable packing materials.	
6	Prior to placing samples within the shipping cooler, it is recommended that samplers line shipping containers with non-combustible, absorbent packing material.	The CLP strongly discourages the use of vermiculite and cat litter as sources for packing material. These materials interfere with labeling and documentation and are difficult to remove from sample containers and shipping containers.
7	Place samples in CLEAN, sealed, watertight shipping containers (metal or hard plastic coolers).	All soil/sediment samples known to contain dioxin should be securely enclosed in metal cans (e.g., paint cans) with the lids sealed.
8	Conduct an inventory of the contents of the shipping cooler/container against the corresponding TR/COC Record.	
9	Cover samples in double-bagged ice to prevent water damage to packing materials.	Do NOT pour loose ice directly into the sample cooler. The ice is used to maintain the temperature of the samples within the shipping cooler.
10	It is recommended that a temperature blank be included in an area within each shipping container which will allow for easy access by the laboratory upon opening the shipping container.	The temperature blank is generally a 40 mL vial filled with water and labeled “temperature blank” but does not have a Sample Number.
11	Ensure that the site name or other site-identifying information does not appear on any documentation being sent to the laboratory.	

### 3.4.4.3 Include Necessary Paperwork

Samplers must properly place the necessary paperwork in the shipping cooler or acceptable container. All paperwork must be placed in a plastic bag or pouch and then secured to the underside of the shipping container lid (see Figure 3-14).



**Figure 3-14. Sample Cooler with Attached TR/COC Record, PES Instructions (if applicable), and Cooler Return Documentation**

Necessary paperwork includes TR/COC Records and sample weight logs (see Figures 3-15 and 3-16), if required (for VOA samples). If PE samples are included in the cooler, the PE instruction sheets must be included with the paperwork. Samplers should contact their RSCC (or designee) for specific paperwork requirements.

<b>USEPA Contract Laboratory Program Sample Weight Log</b>									
<b>Shipped to:</b> AAA Testing Laboratory 1700 Mill Avenue Houston TX 77099 (281) 983-1234							<b>Case No.</b> 39563 <b>DAS No.</b> DAS34 <b>Date Shipped:</b> 9/29/2003		
Sample No.	Matrix	Analysis	Preservative	Bottle/ Tag Number	Tared Weight (g)	Final Weight (g)	Sample Weight (g)	Laboratory Weight	Traffic Report No.
C0036	Subsurface Soil (>12")	CLP TCL Volatiles	Ice Only	199548	32.80	37.20	4.40		3-103018225-092903-0001
C0036	Subsurface Soil (>12")	CLP TCL Volatiles	Ice Only	199547	32.10	38.30	6.20		3-103018225-092903-0001
C0036	Subsurface Soil (>12")	CLP TCL Volatiles	Ice Only	199549	31.20	38.60	7.40		3-103018225-092903-0001
C0037	Surface Soil (0"-12")	CLP TCL Volatiles	Ice Only	199552	32.00	36.90	4.90		3-103018225-092903-0001
C0037	Surface Soil (0"-12")	CLP TCL Volatiles	Ice Only	199551	32.40	37.10	4.70		3-103018225-092903-0001
C0037	Surface Soil (0"-12")	CLP TCL Volatiles	Ice Only	199550	31.90	35.90	4.00		3-103018225-092903-0001
<b>Completed By:</b>					<b>Date:</b>				
All weights are measured in grams									

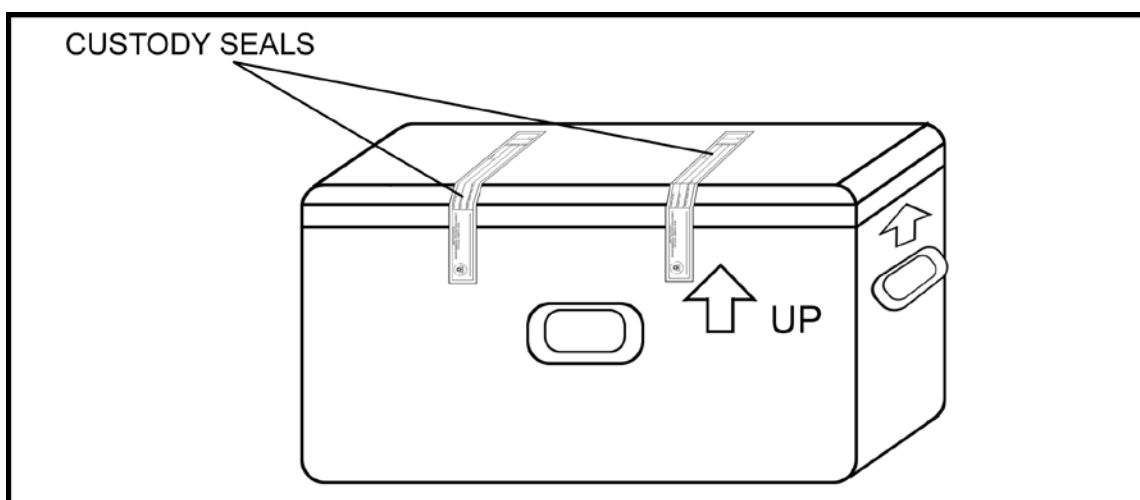
**Figure 3-15. FORMS II Lite Sample Weight Log**

Sample Weight Log Chain of Custody - Additional Info - VOA Samples					
<b>Shipped To:</b> ABC Special Lab 123 Main Street Anywhere, USA		<b>Completed By:</b>  <b>Date:</b>		<b>Case No.</b> 12345 <b>DAS No.</b> DAS123 <b>Date Shipped:</b> 12/24/2010	
CLP Sample #	Y0004	Y0005	Y0006	Y0007	Y0008
Matrix	Soil	Soil	Soil	Soil	Soil
Analyses	CLP TCL Volatiles	CLP TCL Volatiles	CLP TCL Volatiles	CLP TCL Volatiles	CLP TCL Volatiles
Preservative	Ice	Ice	Ice	Ice	Ice
Tag	1011	1013	1015	1017	1019
Tared Weight (g)	32.80	32.10	31.20	32.00	31.90
Final Weight (g)	37.20	38.30	38.60	36.90	35.90
Sample Weight (g)	4.4	6.2	7.4	4.9	4
Laboratory Weight					
COC #	9-062510-135425-0004	9-062510-135425-0004	9-062510-135425-0004	9-062510-135425-0004	9-062510-135425-0004

**Figure 3-16. Scribe Sample Weight Log**

#### 3.4.4.4 Label and Seal Sample Shipping Coolers

After samples are packaged within shipping coolers, samplers must carefully secure the top and bottom of the coolers with tape, place return address labels clearly on the outside of the cooler, and attach the required chain-of-custody seals (see Figure 3-17).



**Figure 3-17. Shipping Cooler with Custody Seals**

If more than one cooler is being delivered to a laboratory, samplers should mark each cooler as “1 of 2”, “2 of 2”, etc. In addition, samplers must accurately complete and attach shipping airbill paperwork for shipment of the samples to the laboratory. An airbill, addressed to the Sample Custodian of the receiving laboratory, should be completed for each cooler shipped. Samplers should receive the correct name, address, and telephone number of the laboratory to which they must ship samples from the RSCC or SMO. To avoid delays in analytical testing, samplers should make sure they are sending the correct types of samples to the correct laboratory when collecting samples for multiple types of analysis. For example, inorganic samples may be shipped to one laboratory for analysis, while organic samples may need to be shipped to another laboratory.

### **3.4.4.5 Ship Samples**

The sampling contractor should ensure that samplers know the shipping company’s name, address, and telephone number. In addition, they should be aware of the shipping company’s hours of operation, shipping schedule, and pick-up/drop-off requirements.

#### **Overnight Delivery**

It is imperative that samples be sent via overnight delivery. Delays caused by longer shipment times may cause technical holding times to expire, which in turn may destroy sample integrity or require the recollection of samples for analysis.

#### **Saturday Delivery**

For shipping samples for Saturday delivery, the sampler **MUST** notify the RSCC (or their designee) and SMO as soon as possible so that SMO will receive the delivery information by 3:00 PM ET on the Friday prior to delivery.

### **3.4.5 Shipment Notification**

When samples are shipped to CLP Laboratories, samplers **must immediately** report all sample shipments to the RSCC (or designee) or to SMO. **Under no circumstances should the sampler contact the laboratory directly.** If samplers are shipping samples after 5:00 PM ET, they must notify the RSCC (or designee) or SMO by 8:00 AM ET on the following business day. Samplers should receive the name and phone number of the appropriate SMO coordinator to contact from the Region/RSCC.

Samplers must provide the following information to the RSCC (or designee) or to SMO:

- Name and phone number at which they can easily be reached (preferably closest on-site phone number if still in the field)
- SMO-assigned CLP Case Number (see Section 2.4.1)
- Number, concentration, matrix and analysis of samples being shipped, and MA number (if required);
- Name of laboratory (or laboratories) to which the samples were shipped

- Airbill number(s)
- Date of shipment
- Case status (i.e., whether or not the Case is complete)
- Problems encountered, special comments, or any unanticipated issues
- When to expect the next anticipated shipment
- An electronic export of the TR/COC Record must be sent as soon as possible after sample shipment via the Electronic Sample Documentation System (ESDS) to transmit FORMS II Lite and Scribe files to SMO. For information regarding electronic export of TR/COC Records, refer to the following Web site:

<http://www.epa.gov/superfund/programs/clp/download/esdsprocedures.pdf>



For Saturday delivery, samplers **MUST** notify the RSCC (or designee) and SMO as soon as possible so that SMO will receive the delivery information by 3:00 PM ET on the Friday prior to delivery.

Samplers should be aware if their Region requires them to notify the RSCC (or designee) and/or SMO of sample shipment.

### 3.4.6 Return Sample Shipping Coolers

CLP laboratories must routinely return sample shipping coolers within 14 calendar days following shipment receipt. Therefore, the sampler should also include cooler return instructions with each shipment. The **sampler** (not the CLP laboratory) is responsible for paying for return of the cooler and should also include shipping airbills bearing the sampler's account number, as well as a return address to allow for cooler return. **Samplers should use the least expensive option possible.**



## Appendix A: Functions within a Sampling Project

The following table describes Quality Assurance Project Plan (QAPP) requirements taken from *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5).

Functions Within a Sampling Project	Elements of that Function
<b><i>Project Management</i></b>	
Project/Task Organization	Identifies the individuals or organizations participating in the project and defines their specific roles and responsibilities.
Problem Definition/Background	States the specific problem to be solved or decision to be made and includes sufficient background information to provide a historical and scientific perspective for each particular project.
Project/Task Description	Describes the work to be performed and the schedule for implementation to include: X Measurements to be made during the course of the project X Applicable technical, regulatory, or program-specific quality standards, criteria, or objectives X Any special personnel and equipment requirements; assessment tools needed X A work schedule and any required project and quality records, including types of reports needed
Quality Objectives and Criteria	Describes the project quality objectives and measurement performance criteria.
Special Training/Certification	Ensures that any specialized training for modified field sampling techniques, field analyses, laboratory analyses, or data validation should be specified.
Documents and Records	X Itemizes the information and records that must be included in the data report package and specifies the desired reporting format for hard copy and electronic forms, when used. X Identifies any other records and/or documents applicable to the project such as audit reports, interim progress reports, and final reports that will be produced. X Specifies or references all applicable requirements for the final disposition of records and documents, including location and length of retention period.
<b><i>Data Generation and Acquisition</i></b>	
Sampling Process Design (Experimental Design)	X Describes the experimental design or data collection design for the project. X Classifies all measurements as critical or non-critical.
Sampling Methods	X Describes the procedures for collecting samples and identifies sampling methods and equipment. Includes any implementation requirements, support facilities, sample preservation requirements, and materials needed. X Describes the process for preparing and decontaminating sampling equipment to include the disposal of decontamination by-products, selection and preparation of sample containers, sample volumes, preservation methods, and maximum holding times for sampling, preparation, and/or analysis. X Describes specific performance requirements for the method. X Addresses what to do when a failure in sampling occurs, who is responsible for corrective action, and how the effectiveness of the corrective action shall be determined and documented
Sample Handling and Custody	X Describes the requirements and provisions for sample handling and custody in the field, laboratory, and transport, taking into account the nature of the samples, the maximum allowable sample holding times before extraction and analysis, and the available shipping options and schedules. X Includes examples of sample labels, custody forms, and sample custody logs.

Functions Within a Sampling Project	Elements of that Function
Analytical Methods	<ul style="list-style-type: none"> <li>X Identifies the analytical methods and equipment required, including sub-sampling or extraction methods, waste disposal requirements (if any), and specific method performance requirements.</li> <li>X Identifies analytical methods by number, date, and regulatory citation (as appropriate). If a method allows the user to select from various options, the method citations should state exactly which options are being selected.</li> <li>X Addresses what to do when a failure in the analytical system occurs, who is responsible for corrective action, and how the effectiveness of the corrective action shall be determined and documented.</li> <li>X Specifies the laboratory turnaround time needed, if important to the project schedule.</li> <li>X Specifies whether a field sampling and/or laboratory analysis Case Narrative is required to provide a complete description of any difficulties encountered during sampling or analysis.</li> </ul>
Quality Control (QC)	<ul style="list-style-type: none"> <li>X Identifies required measurement QC checks for both the field and laboratory.</li> <li>X States the frequency of analysis for each type of QC check, and the spike compounds sources and levels.</li> <li>X States or references the required control limits for each QC check and corrective action required when control limits are exceeded and how the effectiveness of the corrective action shall be determined and documented.</li> <li>X Describes or references the procedures to be used to calculate each of the QC statistics.</li> </ul>
Instrument/Equipment Testing, Inspection, and Maintenance	<ul style="list-style-type: none"> <li>X Describes how inspections and acceptance testing of environmental sampling and measurement systems and their components will be performed and documented. Identifies and discusses the procedure by which final acceptance will be performed by independent personnel.</li> <li>X Describes how deficiencies are to be resolved and when re-inspection will be performed.</li> <li>X Describes or references how periodic preventative and corrective maintenance of measurement or test equipment shall be performed.</li> <li>X Identifies the equipment and/or system requiring periodic maintenance.</li> <li>X Discusses how the availability of spare parts identified in the operating guidance and/or design specifications of the systems will be assured and maintained.</li> </ul>
Instrument/Equipment Calibration and Frequency	<ul style="list-style-type: none"> <li>X Identifies all tools, gauges, instruments, and other sampling, measuring, and test equipment used for data collection activities affecting quality that must be controlled, and at specific times, calibrated to maintain performance within specified limits.</li> <li>X Identifies the certified equipment and/or standards used for calibration.</li> <li>X Describes or references how calibration will be conducted using certified equipment and/or standards with known valid relationships to nationally recognized performance standards. If no such standards exist, documents the basis for calibration.</li> <li>X Indicates how records of calibration shall be maintained and traced to the instrument.</li> </ul>
Inspection/Acceptance of Supplies and Consumables	<ul style="list-style-type: none"> <li>X Describes how and by whom supplies and consumables shall be inspected and accepted for use in the project.</li> <li>X States acceptance criteria for such supplies and consumables.</li> </ul>
Non-direct Measurements	<ul style="list-style-type: none"> <li>X Identifies any types of data needed for project implementation or decision-making that are obtained from non-measurement sources (e.g., computer databases, programs, literature files, historical databases).</li> <li>X Describes the intended use of data.</li> <li>X Defines the acceptance criteria for the use of such data in the project.</li> <li>X Specifies any limitations on the use of the data.</li> </ul>
Data Management	<ul style="list-style-type: none"> <li>X Describes the project data management scheme, tracing the data path from generation in the field or laboratory to their final use or storage.</li> <li>X Describes or references the standard record-keeping procedures, document control system, and the approach used for data storage and retrieval on electronic media.</li> </ul>

## Appendix B: CLP Sample Collection Guidelines for VOAs in Soil by SW-846 Method 5035A

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A. Preferred Options for the Contract Laboratory Program (CLP) are Options 1, 2, and 3:

This method employs sample vials that are filled and weighed in the field and never opened during the analytical process. As a result, sampling personnel should be equipped with a portable balance capable of weighing to 0.01g.



Soil samples must be placed on their sides prior to being frozen or placed on ice. Dry ice or field freezers are the only options.

### Option 1.

#### Closed-system Vials:

##### Container - tared or preweighed 40 mL VOA vial containing a magnetic stir bar.

Collect 5 g of soil per vial (iced or frozen in the field). Check the pre-tared weight of the (dry) VOA vials prior to departure for the sampling event under controlled conditions. Weigh vials and soil samples to the nearest 0.01 g. This check is to ensure that the original weight was properly recorded.

<b>Regular Samples</b>	3 Vials - Dry (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	<hr/> 4 Total Vials

<b>Regular Samples Requiring QC Analysis</b>	9 Vials - Dry (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	<hr/> 10 Total Vials

### Option 2.

#### Closed-system Vials Containing Water:

##### Container - tared or pre-weighed 40 mL VOA vial containing a magnetic stir bar and 5 mL water.

Collect 5 g of soil per vial (iced or frozen in the field). Weigh vials and soil samples to the nearest 0.01 g.

<b>Regular Samples</b>	2 Vials with water added (5 g soil and 5 mL water per vial)
	1 Vial - Dry (5 g soil in vial)
	1 Vial - Dry (filled with soil, no headspace)
	<hr/> 4 Total Vials (2 with water and 2 dry)

<b>Regular Samples Requiring QC Analysis</b>	6 Vials with water added (5 g soil and 5 mL water per vial)
	1 Vials - Dry (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	<hr/> 8 Total Vials (6 with water and 2 dry)

### Option 3.

##### Container - 5 g Samplers or equivalent and coring tool used as a transport device.



All Samplers should be iced or frozen in the field and bagged individually.

<b>Regular Samples</b>	3 Samplers (5 g soil per Sampler)
	1 Vial - Dry (filled with soil, no headspace)
	<hr/> 4 Total (3 Samplers and 1 Vial)

<b>Regular Samples</b>	9 Samplers (5 g soil per Sampler)
<b>Requiring QC Analysis</b>	1 Vial - Dry (filled with soil, no headspace)
	<u>10 Total (9 Samplers and 1 Vial)</u>

B. Options 4, 5, and 6 are NOT preferred options for the CLP:

#### **Option 4.**

##### **Closed-system Vials:**

**Container - tared or preweighed 40 mL VOA vial containing a magnetic stir bar and preservative.**

Collect 5 g of soil per vial and add Sodium bisulfate (NaHSO<sub>4</sub>) preservative (5 mL water + 1 g NaHSO<sub>4</sub>) - iced in the field.

**Caution: This option is NOT a Preferred Option for the CLP because:**

NaHSO<sub>4</sub> preservation creates low pH conditions that will cause the destruction of certain CLP target analytes (e.g., vinyl chloride, trichloroethene, trichlorofluoromethane, cis- and trans-1,3-dichloropropene). Projects requiring the quantitation of these analytes should consider alternative sample preservation methods. NaHSO<sub>4</sub> also cannot be used on carbonaceous soils. Check the soil before using this method of collection! Soil can be checked by placing a test sample in a clean vial, then adding several drops of NaHSO<sub>4</sub> solution. If the soil bubbles, use Option 4b and note this issue on the TR/COC Record.

#### **Option 4a.** Samples preserved in the field

<b>Regular Samples</b>	2 Vials with NaHSO <sub>4</sub> preservative added (5g soil per vial)
	1 Vial without NaHSO <sub>4</sub> preservative added (5g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	<u>4 Total Vials (2 with NaHSO<sub>4</sub> preservative and 2 without)</u>
<b>Regular Samples</b>	6 Vials with NaHSO <sub>4</sub> preservative added (5g soil per vial)
<b>Requiring QC Analyses</b>	3 Vials without NaHSO <sub>4</sub> preservative added (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	<u>10 Total Vials (6 with NaHSO<sub>4</sub> and 4 without)</u>

**Option 4b.** Samples are preserved by the laboratory (No NaHSO<sub>4</sub> preservative is added to these samples in the field).

<b>Regular Samples</b>	3 Vials - Dry (5 g soil per vial)
	1 Vial - Dry (filled with soil, no headspace)
	<u>4 Total Vials</u>
<b>Regular Samples</b>	9 Vials - Dry (5 g soil per vial)
<b>Requiring QC Analyses</b>	1 Vial - Dry (filled with soil, no headspace)
	<u>10 Total Vials</u>

#### **Option 5.**

##### **Methanol Preservation (medium-level analysis only):**

**Container - tared or pre-weighed 40 mL VOA vials containing 5 mL methanol.**

Collect 5 g of soil per vial (iced in the field).

**Caution: This is NOT a preferred option for the CLP because:**

Samples preserved with methanol can only be analyzed by the medium-level method. Low-level Contract Required Quantitation Limit (CRQLs) cannot be achieved when samples are preserved this way. If this soil

option is used, then samples for low-level analysis by one of the other options should also be collected and accompany the medium-level soil.

Additional problems associated with use of methanol as a preservative in the field include:

- Possible contamination of the methanol by sampling-related activities (e.g., absorption of diesel fumes from sampling equipment);
- Leakage of methanol from the sample vials during shipping, resulting in loss of VOAs prior to analysis.

<b>Regular Samples</b>	2 Vials (5 g soil and 5 mL methanol per vial)
	1 Vial - Dry (filled with soil, no headspace)
	3 Total Vials (2 with methanol and 1 dry)

<b>Regular Samples Requiring QC Analyses</b>	6 Vials (5 g soil and 5 mL methanol per vial)
	1 Vial - Dry (filled with soil, no headspace)
	7 Total Vials (6 with methanol and 1 dry)



If shipping samples containing methanol as a preservative, a shipping label must be used to indicate methanol. This label must also contain the United Nations (UN) identification number for methanol (UN 1230), and indicate Limited Quantity.

## Option 6.

### Glass Containers filled with sample - No Headspace:

#### Container - 4 oz Glass Jars.

Glass container filled with soil with no headspace and iced.

#### Caution: This is NOT a preferred option for the CLP because:

Samples collected in this manner lose most of their volatile analytes prior to analysis when the sample containers are opened and sub-sampled in the laboratory. This option is only available due to Regional requirements.

<b>Regular Samples</b>	2 Glass Jars (4 oz) filled with sample, no headspace
	1 Vial - Dry (filled with soil, no headspace)
	3 Total Containers

<b>Regular Samples Requiring QC Analyses</b>	2 Glass Jars (4 oz) filled with sample, no headspace
	1 Vial - Dry (filled with soil, no headspace)
	3 Total Containers

#### C. Caution:

1. Extreme care must be taken to ensure that frozen or iced samples do not break during shipment.
2. Before adding soil to pre-weighed vials containing a stir bar, weigh the vials to confirm the tared weight. If the weight varies by more than 0.1 g, record the new weight on the label and the sample documentation. Do NOT add labels to these vials once the tared weight has been determined or confirmed.

#### D. Dry Samples:

All options include taking a sample in a dry 40 mL VOA vial (or a 4 oz wide mouth jar) with no headspace. No water,  $\text{NaHSO}_4$ , or methanol is added to this sample. This sample is taken to determine moisture content; therefore, it does not need to be tared or have a stir bar.

#### E. Iced or Frozen Samples:

1. Iced means cooled to  $4^\circ\text{C}$  ( $\pm 2^\circ\text{C}$ ) immediately after collection.
2. Frozen means cooled to between  $-7^\circ\text{C}$  and  $-15^\circ\text{C}$  immediately after collection.
3. Dry ice is not a long-term freezing agent and may contaminate samples.

F. Sample Delivery:

CLP strongly recommends that all samples reach the laboratory by COB the next day after sample collection.

G. Notes:

1. For Options 2, 4, and 5, check the weight of the pre-tared VOA vials plus liquid in the field due to the possibility that liquid leaked out during packing, transit, or deployment in the field just prior to sampling. This check is to ensure that the original weight is properly recorded.
2. For Option 4, samples can be preserved with NaHSO<sub>4</sub> either:
  - In the field; or
  - In the laboratory upon receipt. In this case, the sampler should put the following information in the Preservation Column of the TR/COC Record - "To be preserved at lab with NaHSO<sub>4</sub>". This Regional request should also be communicated to SMO so that the laboratory can be notified.
3. Regional QAPPs may require the use of Option 5. Please note that this option is for medium-level analysis ONLY.
4. If water, methanol, or NaHSO<sub>4</sub> preservative is added to the vials in the field, a field blank containing the appropriate liquid used in the vials should be sent to the laboratory for analysis.

## Appendix C: General CLP Sample Collection Guidelines

### VOAs in Water

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Regional guidance and/or specific Project Plan requirements will supersede the guidelines listed below.

#### Collect the following:

- At least three 40 mL glass containers with polytetrafluoroethylene (PTFE)-lined septa and open top screw-caps that are filled to capacity with no air bubbles, preserved to a pH of 2 with HCl, and cooled to 4°C ( $\pm 2^\circ\text{C}$ ) immediately after collection. **DO NOT FREEZE THE SAMPLES.**

**Regular Samples** 3 vials (40 ml filled to capacity with no headspace or air bubbles)

**Regular Samples** 3 vials for Sample (40 ml filled to capacity with no headspace or air bubbles)

**Requiring QC Analysis** 3 vials for MS (40 ml filled to capacity with no headspace or air bubbles)

3 vials for MSD (40 ml filled to capacity with no headspace or air bubbles)

- If Selected Ion Monitoring (SIM) analysis is requested, at least two additional 40 mL glass containers with PTFE-lined septa and open top screw-caps that are filled to capacity with no air bubbles, preserved to a pH of 2 with HCl, and cooled to 4°C ( $\pm 2^\circ\text{C}$ ) immediately after collection.

**Regular Samples** 3 vials for Sample (40 ml filled to capacity with no headspace or air bubbles)

**With SIM Analysis** 2 vials (40 ml filled to capacity with no headspace or air bubbles)

#### Test for Carbonates, Residual Chlorine, Oxidants, and Sulfides:

- It is very important that samplers obtain Regional guidance when testing and ameliorating for:
  - Carbonates;
  - Residual chlorine (e.g., municipal waters or industrial waste waters that are treated with chlorine prior to use or discharge); or
  - Oxidants.
- VOA samples containing carbonates react with the acid preservative causing effervescence (due to formation of carbon dioxide), which can cause loss of volatile analytes.
- Residual chlorine present in VOA samples can continue to react with dissolved organic matter. This continuous reaction may lead to inaccurate quantitation of certain analytes present in the sample at the time of collection.
- Residual chlorine and oxidants present in VOA samples can cause degradation of certain volatile analytes (e.g., styrene).

#### Perform the following for *Pre-Preserved Vials*:

- Pour the sample slowly down the edge of the sample vial to avoid excess aeration or agitation of the sample during filling.
- Fill the vial completely so that a reverse (convex) meniscus is present and ensure that there are no air bubbles present (either in the body or especially at the top of the vial).
- Place the septum on the vial so that the PTFE side is in contact with the sample, and then firmly tighten the cap.
- Gently flip the vial a few times to ensure that the sample is mixed with the acid preservative.
- While holding the vial upright, gently tap the sample to check for air bubbles (either in the body or especially at the top of the vial).
- If air bubbles are present, discard the sample and select a new vial in which to recollect a new sample. Repeat Steps 1 to 5 above.
- Do NOT mix or composite samples for VOAs.

8. Cool sample to a temperature of 4°C ( $\pm 2^\circ\text{C}$ ). Samplers should begin the cooling process in the field as samples are being collected. Double-bagged ice should be used. DO NOT FREEZE WATER SAMPLES.
9. Immediately transfer the vial to the sample shuttle (device that contains a “set” of VOA vials) once it has been collected. Do NOT allow ice to touch the vials.

**Perform the Following for *Empty* Vials:**

1. Rinse the vial with sample water prior to actual sample collection and preservation.



Regions vary in their approach to pre-rinsing and/or re-using sample vials (e.g., some Regions do not recommend pre-rinsing and/or re-use of pre-cleaned containers using sample water). Be sure to follow Regional guidance.

2. Add 1-2 mL of acid preservative to the vial. Check to ensure that the sample you are collecting requires a preservative (follow Regional guidance).
3. Pour the sample slowly down the edge of the sample vial to avoid excess aeration and agitation of the sample.
4. Fill the vial completely so that a reverse (convex) meniscus is present and ensure that there are no air bubbles present (either in the body or especially at the top of the vial).
5. Place the septum on the vial so that the PTFE side is in contact with the sample, and then firmly tighten the cap.
6. Gently flip the vial a few times to ensure that the sample is mixed with the acid preservative.
7. While holding the vial upright, gently tap the vial to check for air bubbles (either in the body or especially at the top of the vial).
8. If air bubbles are present, discard the sample and recollect a new sample using the same sample vial. Repeat Steps 1 - 7 above.
9. Check the re-collected sample for air bubbles. If air bubbles are present, additional sample water may be added to the vial to eliminate air bubbles. If there are air bubbles after three consecutive attempts to eliminate air bubbles by the addition of sample water, the entire sample and sample vial should be discarded and a new sample collected.
10. Do NOT mix or composite samples for VOAs.
11. Cool sample to a temperature of 4°C ( $\pm 2^\circ\text{C}$ ). Samplers should begin the cooling process in the field as samples are being collected. Double-bagged ice should be used. DO NOT FREEZE WATER SAMPLES.
12. Immediately transfer the vial to the sample shuttle (device which contains a “set” of VOA vials) once it has been collected. Do NOT allow ice to touch the vials.

**Things to Remember:**

- Samples must be shipped as soon as possible, preferably on the same day as sample collection to avoid exceeding sample holding times. If overnight transit is not possible, samples should be maintained at 2 - 4°C until they are shipped to the laboratory.
- If samples are not preserved (a requirement for certain analytes), the technical holding time is shortened to 7 days.

## Appendix D: Sampling Techniques and Considerations

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During a sampling event, the sampler is expected to follow prescribed sampling techniques. The sampler should also be aware of any special sampling considerations, contaminant issues, and sample compositing and mixing methods that could affect their sampling efforts.



Regional guidance will take precedence over any of the techniques and considerations listed below.

### D.1 General Sampling Techniques

Information regarding surface water, sediment, soil, and groundwater sampling can be found in many documents including, but not limited to, the following sources:

- Compendium of ERT Surface Water and Sediment Sampling Procedures, EPA/540/P-91/005
- Compendium of ERT Soil Sampling and Surface Geophysics Procedures, EPA/540/P-91/006
- Compendium of ERT Groundwater Sampling Procedures, EPA/540/P-91/007
- Lead in Surface Wipe Samples, NIOSH Method 9100, August 15, 1994
- Elements on Wipes, NIOSH Method 9102, March 15, 2003
- Surface Wipe Sampling Procedure, IH75190, Brookhaven National Laboratory, Industrial Hygiene Group, February 9, 2009
- General Air Sampling Guidelines, US EPA ERT, SOP 2008, November 16, 1994
- Quality Assurance Sampling Plan for Environmental Response (QASPER) software, Version 4.1, ERT
- *Requirements for the Preparation of Sampling and Analysis Plans*; United States Army Corps of Engineers, February 1, 2001, EM 200-1-3

When working with potentially hazardous materials, samplers should follow USEPA and OSHA requirements, specific health and safety procedures, and DOT requirements.

### D.2 Special Sampling Considerations

Samplers should refer to Regionally-developed SOPs to obtain specific procedures for properly collecting and preserving samples in the field. For additional guidance regarding sampling for VOAs in soil and water, see Appendices B and C. Samplers should obtain Regional guidance when testing and ameliorating for:

- Carbonates in VOA soil and water
- Residual chlorine in VOA soil and water, or cyanide water
- Oxidants in VOA soil and water
- Sulfides in cyanide

### D.3 Contaminant Sampling

Certain compounds can be detected in the parts-per-billion (ppb) and/or parts-per-trillion (ppt) range. Extreme care **MUST** be taken to prevent cross-contamination of these samples. The following precautions should be taken when trace contaminants are a concern:

- Disposable gloves should be worn each time a different location is sampled.
- When collecting both surface water and sediments, surface water samples should be collected first. This reduces the chance of sediment dispersal into surface water, and the resulting loss of surface water sample integrity.
- Sampling should occur in a progression from the least to the most contaminated area, if this information is known to the sampling team.
- Samplers should use equipment constructed of PTFE, stainless steel, or glass that has been properly pre-cleaned for the collection of samples for trace organic and/or inorganic analyses. Equipment constructed of plastic or polyvinyl chloride (PVC) should **NOT** be used to collect samples for trace organic compound analyses.
- Equipment constructed of stainless steel should **NOT** be used to collect samples for trace metals analyses.

### D.4 Sample Compositing

Sample compositing is a site-specific activity that must be conducted according to the SAP. Compositing is typically used for large sites under investigation to improve the precision (i.e., lower the variance) of the estimated average

contaminant concentrations. **Samples for VOA analysis should NOT be composited to minimize loss of VOAs/analytes.**

Composite samples consist of a series of discrete grab samples that are mixed together to characterize the average composition of a given material. The discrete samples are usually of equal volume, but may be weighted to reflect an increased flow or volume. Regardless, all discrete samples must be collected in an identical manner and the number of grab samples forming a composite should be consistent. There are several compositing techniques that may be required such as:

- Flow-proportioned – Collected proportional to the flow rate during the compositing period by either a time-varying/constant volume or a time-constant/varying volume method. This technique is usually associated with wastewater or storm water runoff sampling.
- Time – Composed of a varying number of discrete samples collected at equal time intervals during the compositing period. This technique is typically used to sample wastewater and streams, and in some air sampling applications.
- Areal – Collected from individual grab samples collected in an area or on a cross-sectional basis. Areal composites are comprised of equal volumes of grab samples where all grabs are collected in an identical manner. This technique is typically used for estimating average contaminant concentrations in soils or sediments. This technique is useful when contaminants are present in nugget form (i.e., TNT chunks, lead shot, etc.), thus exhibiting large differences in concentration over a small sample area.
- Vertical – Collected from individual grab samples but taken from a vertical cross section. Vertical composites are comprised of equal volumes of grab samples where all grab samples are collected in an identical manner. Examples would include vertical profiles of a soil borehole or sediment columns.
- Volume – Collected from discrete samples whose aliquot volumes are proportional to the volume of sampled material. Volume composites are usually associated with hazardous waste bulking operations where the sample represents combined or bulked waste.

When compositing solid or tissue samples (i.e., sediment, soil, or sludge) for analysis of compounds present in trace quantities, use a stainless steel or PTFE bowl and spatula.

#### D.5 Sample Mixing and Homogenizing


Mixing of the sample for the remaining parameters is necessary to create a representative sample media. It is extremely important that solid samples be mixed as thoroughly as possible to ensure that the sample is as representative as possible of the sample location. Please refer to the project-specific SAP regarding instructions on removal of any extraneous materials (e.g., leaves, sticks, rocks, etc.). The mixing technique will depend on the physical characteristics of the solid material (e.g., particle size, moisture content, etc.). Grinding and homogenization of tissue is easier when it is partially frozen. The mixing container should be large enough to hold the sample volume and accommodate the procedures without spilling. Both the mixing container (generally a bowl or tray) and the mixing implement should be properly decontaminated before use. Samples should be homogenized according to procedures listed in the project-specific SAP. Table D-1 provides a short procedure for mixing a soil sample with a small particle size (less than 1/4 in) and filling sample containers in the field.

**Table D-1. Mixing a Sample and Filling Sample Containers**


Step	Action
1	Roll the contents of the compositing container to the middle of the container and mix.
2	Quarter the sample and move to the sides of the container.
3	Mix each quarter individually, then combine and mix OPPOSITE quarters, then roll to the middle of the container.
4	Mix the sample once more, and then quarter the sample again.
5	Mix each quarter individually, then combine and mix ADJACENT corners, then roll to the middle of the container. The goal is to achieve a consistent physical appearance before sample containers are filled.
6	Flatten piled material into an oblong shape.
7	Using a flat-bottomed scoop, collect a strip of soil across the entire width of the short axis and place it into a sample container.
8	Repeat Step 7 at evenly-spaced intervals until the sample containers are filled.
9	Record the approximate quantity of each subsample in the field log book.

## Appendix E: Sampling Checklists


### Appendix E-1: Personnel Preparation Checklist (Page 1 of 1)

Personnel Briefing	Yes	No	Comments
1. Did you review sampling team responsibilities and identify individual(s) responsible for corrective actions?			
2. Did you ensure that you have met the appropriate personal safety and protection requirements?			
3. Did you identify sampling locations and receive permission to access them, as appropriate?			
<div style="display: flex; align-items: flex-start;">  <div> <p>4. Did you contact the appropriate utility companies PRIOR to the start of sampling?</p> <p>By law, utility companies must be contacted prior to the start of digging/sampling so that any underground utilities (gas lines, water lines, electrical lines, etc.) can be marked. A list of one-call centers for each state may be found at: <a href="http://www.call811.com">http://www.call811.com</a>.</p> </div> </div>			
5. If sampling on private property, do you have sample receipts to provide to the property owner for all samples taken and removed from the property?			
6. Have you determined the number and type of samples to be collected?			
7. Did you review sample collection methods?			
8. Have you reviewed sample container requirements?			
9. Did you review decontamination requirements, procedures, and locations?			
10. Did you determine holding times and conditions?			
11. Did you determine Performance Evaluation (PE) and Quality Control (QC) sample requirements?			
12. Have you obtained shipping cooler temperature blanks, if required?			
13. Did you review sample label and tag requirements?			
14. Did you review Traffic Report/Chain of Custody (TR/COC) record and custody seal requirements?			
15. Have you obtained the laboratory name, shipping addresses, and telephone number?			
16. Did you review cooler return instructions?			
17. Have you obtained shipping company information (name, telephone number, account number, pickup schedule)?			
18. Have you obtained shipping schedules?			
19. Did you review shipment reporting requirements and the appropriate contact names and telephone numbers for reporting?			
20. Have you included any sampler comments regarding sampling issues (e.g., low volumes, matrix, suspected concentrations based on field measurements)?			




**Appendix E-2: General Sample Collection Checklist**  
(Page 1 of 1)

General Sample Collection	Yes	No	Comments
1. Did you identify and mark the sampling location with buoys, flags, or stakes according to the sampling plans, maps, and grids?			
2. If the sampling location is inaccessible, did you contact the appropriate field or Regional personnel for instructions?			
3. Did you use the correct sampling equipment?			
4. Did you follow the correct decontamination procedures?			
5. Did you follow the correct collection procedures?			
6. Did you use the correct sample containers for each sample collected?			
7. Did you use certified clean containers for all samples? Are certificates kept on record?			
8. Did you use certified clean water for all field, trip, equipment and rinsate blanks? Are certificates kept on record?			
9. Did you collect the correct volume for each sample?			
10. Did you collect the correct type of sample, including primary samples and Quality Control (QC) samples?			
11. Did you properly preserve each sample collected?			
<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional USEPA laboratory. Then the Region copy of the TR/COC shall be sent to the USEPA laboratory.</p> </div> </div>			
13. If sampling on private property, did you provide a sample receipt to the owner of the property for all samples taken and removed from the property?			

**Appendix E-3: Completing Field Logbook Checklist**  
(Page 1 of 1)


Completing Field Logbook		Yes	No	Comments
1.	Did you use waterproof ink when writing in the field logbook?			
2.	<p>Did you document sampling project information such as:</p> <p>X Project name, ID, and location</p> <p>X Names of samplers</p> <p>X Geological observations, including maps</p> <p>X Atmospheric conditions</p> <p>X Field measurements</p> <p>X Sampling dates, times, and locations?</p>  <p>Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional USEPA laboratory. Then the Region copy of the TR/COC shall be sent to the USEPA laboratory.</p>			
3.	<p>Did you record sampling activity information such as:</p> <p>X Sampling dates and times</p> <p>X Sample identifications</p> <p>X Sample matrices</p> <p>X Sample descriptions (e.g., odors and/or colors)</p> <p>X Number of samples taken</p> <p>X Sampling methods/equipment</p> <p>X Description of QC samples?</p>			
4.	Did you document any and all deviations from the sampling plan?			
5.	Did you document any and all difficulties in sampling and/or any unusual circumstances?			
6.	Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

**Appendix E-4: Completing Handwritten Sample Labels Checklist**  
(Page 1 of 1)


Completing Handwritten Sample Labels	Yes	No	Comments
1. Did the Region provide CLP Sample numbers and SMO-assigned CLP Case numbers?			
2. If additional CLP Sample numbers were needed, did you contact the appropriate Regional personnel?			
3. Were the CLP Sample numbers and SMO-assigned CLP Case numbers on the labels correct? Organic CLP Sample numbers begin with the Regional letter code, followed by letters and numbers. Inorganic CLP Sample Numbers begin with "M," followed by the Regional letter code, and then letters and numbers.			
4. Were samples uniquely numbered and designated to only one sample?   Samples collected for total metal and dissolved metal analyses must receive separate, unique, CLP Sample numbers.			
5. Were Quality Control (QC) samples numbered accordingly?			
6. Were the specific requirements followed for total and dissolved metals analysis, QC and Performance Evaluation (PE) samples, and SW-846 Method 5035A?			
7. Were all temperature blanks labeled with "TEMPERATURE BLANK"?			
8. Was a sample label containing the CLP Sample number, SMO-assigned CLP Case number, location, concentration, preservative, and the analysis, attached to each sample bottle or container as the sample was collected?   Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional USEPA laboratory. Then, the Region copy of the TR/COC record shall be sent to the USEPA laboratory.			
9. Was clear tape placed over the sample labels to protect the labels from moisture and to help the labels adhere to the sample bottle?   Use only CLEAR tape over the sample labels and avoid wrinkles in the tape and the sample labels.			
10. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

## Appendix E-5: Completing Handwritten Sample Tags & Custody Seals Checklists



(Page 1 of 1)

Completing Handwritten Sample Tags	Yes	No	Comments
1. Was waterproof ink used on the sample tags?			
2. If Regionally required for individual sample containers, was the project code on the sample tag completed?			
3. Was the station number on the sample tag completed?			
4. Was the date filled in using the format MM/DD/YYYY?			
5. Was the time of sample collection indicated in military time format HH:MM?			
6. Was the box checked indicating composite or grab sample?			
7. Was the station location on the sample tag completed?			
8. Did you indicate whether or not the sample was preserved by checking "yes" or "no"?			
9. Was the appropriate analysis indicated on the sample tag?			
10. Were the appropriate CLP Sample number and SMO-assigned CLP Case number indicated and cross-referenced with the numbers on the sample label?			
11. Did you sign the sample tags?			
<div style="display: flex; align-items: center;">  <div> <p>12. Did you attach the sample tag to the neck of the sample bottle with string, stretch string, or wire?</p> <p><b>Do NOT</b> use wire to attach a sample tag to a metal sample.</p> </div> </div>			
13. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			
Completing Custody Seals	Yes	No	Comments:
1. Did you sign and date the custody seal?			
2. Did you attach a completed custody seal to the sample bottle, container, or plastic bag, placing the seal over the cap or lid of each sample bottle or container or on the bag opening such that it will be broken if the sample bottle, container, or bag is opened or tampered with?			
3. As appropriate, did you attach the completed custody seal to the sample shipping container or cooler, placing the seal such that it will be broken if the container or cooler is opened or tampered with?			
4. Were all errors corrected by crossing a line through the error, initialing the error, dating the error, and then adding the correct information?			

**Appendix E-6: Packing Sample Container Checklist**  
(Page 1 of 1)

Packing Sample Container		Yes	No	Comments
1.	Did you follow all State, Federal, Department of Transportation (DOT), and International Air Transportation Association (IATA) regulations governing the packaging of environmental and hazardous samples?   If samples contain methanol preservation (e.g., samples to be analyzed by SW-846 Method 5035A), refer to the packaging instructions in Appendix A.			
2.	Were all CLP Sample numbers, SMO-assigned CLP Case numbers, analyses, labels, tags, and custody seals attached to the correct sample containers?			
3.	Is modified analysis indicated if requested?			
4.	Was an inventory conducted of CLP Sample numbers, SMO-assigned CLP Case numbers, analyses, and containers, and verified against the TR/COC records?			
5.	Were the correct number and type of Performance Evaluation (PE) and Quality Control (QC) samples collected?			
6.	Were all sample containers sealed in clear plastic bags with the sample label and tag visible through the packaging?			
7.	Were all soil/sediment samples known or suspected to contain dioxin securely enclosed in metal cans (e.g., paint cans) with the lids sealed?			
8.	Was suitable absorbent packing material placed around the sample bottles or containers?			
9.	Were the outsides of metal containers labeled properly with the CLP Sample number, SMO-assigned CLP Case number, and the analysis of the sample inside?			

**Appendix E-7: Packing Shipping Container Checklist**  
(Page 1 of 1)

Packing Shipping Container	Yes	No	Comments
1. Were you shipping samples in a clean waterproof metal or hard plastic ice chest or cooler in good condition?			
2. Were all non-applicable labels from previous shipments removed from the container?			
3. Were all inside and outside drain plugs closed and covered with suitable tape (e.g., duct tape)?			
4. Was the inside of the cooler lined with plastic (e.g., large heavy-duty garbage bag)?			
5. Was the lined shipping cooler packed with noncombustible absorbent packing material?			
6. Were sample containers placed in the cooler in an upright position not touching one another?			
7. Was a sample shipping cooler temperature blank included in the cooler?			
8. Did the documentation in the cooler only address the samples in that cooler?			
9. Was the site name absent from all documentation?   Under no circumstances should the site name appear on any documentation being sent to the laboratory, unless the laboratory is a Regional USEPA laboratory. Then the Region copy of the TR/COC shall be sent to the USEPA laboratory.			
10. Was there sufficient packing material around and in between the sample bottles and cans to avoid breakage during transport?			
11. If required, was double-bagged ice placed on top and around sample bottles to keep the samples cold at 4°C (± 2° C)?   Do not pack loose ice into the cooler.			
12. Was the top of the plastic liner fastened and secured with tape?			
13. Was a completed custody seal placed around the top of the fastened plastic liner (if required by the Region)?			
14. Were all sample documents enclosed within the cooler (e.g., TR/COC record and cooler return instructions) in a waterproof plastic bag?			
15. Was the plastic bag, containing the documentation, taped to the underside of the cooler lid?			
16. Were cooler return instructions and airbills taped to the underside of the cooler lid?			
17. Was the return address of the cooler written with permanent ink on the underside of the cooler lid?			
18. Was tape placed around the outside of the entire cooler and over the hinges?			
19. Were the completed custody seals placed over the top edge of the cooler so the cooler cannot be opened without breaking the seals?			
20. Was the return address label attached to the top left corner of the cooler lid?			
21. Were instructional labels attached to the top of the cooler, as necessary (e.g., "This End Up," "Do Not Tamper With," or "Environmental Laboratory Samples")?			
22. Have all US D.O.T. regulations been met for the shipment when shipping hazardous samples?			
23. If shipping samples containing methanol as a preservative (e.g., samples to be analyzed by SW-846 Method 5035A), was a label used to indicate methanol, the United Nations (UN) identification number for methanol (UN 1230), and Limited Quantity?			

**Appendix E-8: Shipping & Reporting CLP Samples Checklist**  
(Page 1 of 1)

<b>Shipping CLP Samples</b>		<b>Yes</b>	<b>No</b>	<b>Comments:</b>
1.	Did you follow all State, Federal, Department of Transportation (DOT), and International Air Transportation Association (IATA) regulations governing the shipment of environmental and hazardous samples?			
2.	Was a separate airbill filled out for each cooler being shipped?			
3.	Was the airbill filled out completely, including correct laboratory name, address, and telephone number, identification of recipient as "Sample Custodian," and appropriate delivery option (e.g., overnight or Saturday)?			
4.	Was the completed airbill attached to the top of the cooler with the correct laboratory address?			
5.	If more than one cooler was being shipped to the same laboratory, were they marked as "1 of 2," "2 of 2," etc.?			
6.	Were the samples being shipped "overnight" through a qualified commercial carrier?			
<b>Reporting CLP Samples</b>		<b>Yes</b>	<b>No</b>	<b>Comments:</b>
1.	Did you contact the RSCC (or designee) or the Contract Laboratory Program Sample Management Office (SMO) on the same day samples were shipped?			
2.	If the samples were shipped after 5:00 PM Eastern Time (ET), were they reported to the RSCC (or designee) or to SMO by 8:00 AM ET the following business day?			
3.	Did you notify the RSCC (or designee) or SMO so that SMO will receive the delivery information by 3:00 PM ET on Friday for sample shipments that will be delivered to the laboratory on Saturday?			
4.	Did you provide the RSCC (or designee) or SMO with: X Your name, phone number, and Region number; X Case Number of the project; X Modified Analysis Number, if requested; X Exact number of samples, matrix(ces), concentration(s), and type of analysis; X Laboratory(ies) to which the samples were shipped; X Carrier name and airbill number; X Date of shipment; X Date of next shipment; and X Any other information pertinent to the shipment?			

## Appendix F: Glossary

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**Analyte** -- The element, compound, or ion that is determined in an analytical procedure; the substance or chemical constituent of interest.

**Analytical Services Branch (ASB)** -- Directs the Contract Laboratory Program (CLP) from within the United States Environmental Protection Agency's (USEPA's) Office of Superfund Remediation and Technology Innovation (OSRTI) in the Office of Solid Waste and Emergency Response (OSWER).

**Aroclor** -- Polychlorinated biphenyls (PCBs) or a class of organic compounds with 1 to 10 chlorine atoms attached to biphenyl and a general chemical formula of  $C_{12}H_{10-x}Cl_x$ . PCBs, commercially produced as complex mixtures containing multiple isomers at different degrees of chlorination, were marketed in North America under the trade name Aroclor.

**Case** -- A finite, usually predetermined, number of samples collected over a given time period from a particular site. Case numbers are assigned by the Sample Management Office (SMO). A Case consists of one or more Sample Delivery Groups (SDGs).

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** -- First authorized by Congress in December 1980, and amended in 1986, CERCLA provided broad Federal authority to respond directly to the release or possible release of hazardous substances that may endanger human health or the environment. CERCLA also established a Trust Fund to provide for cleanup when no responsible party could be identified; hence, CERCLA is commonly referred to as "Superfund."

**Contract Laboratory Program (CLP)** -- A national program of commercial laboratories under contract to support the USEPA's nationwide efforts to clean up designated hazardous waste sites by providing a range of chemical analytical services to produce environmental data of known and documented quality. This program is directed by USEPA's Analytical Services Branch (ASB).

**Contract Laboratory Program Project Officer (CLP PO)** -- Monitors technical performance of the contract laboratories in each Region.

**Contract Laboratory Program Sample Management Office (CLP SMO)** -- A contractor-operated facility operated under the CLP, awarded and administered by the USEPA, which provides necessary management, operations, and administrative support to the CLP. SMO coordinates and schedules sample analyses, tracks sample shipments and analyses, receives and tracks data for completeness and compliance, and processes laboratory invoices.

**Custody Seal** -- An adhesive label or tape that is used to seal a sample bottle or container that maintains chain-of-custody and that will break if the sample bottle or container is opened or tampered with.

**Cyanide (Total)** -- Cyanide ion and complex cyanides converted to hydrocyanic acid (HCN) by reaction in a reflux system of a mineral acid in the presence of magnesium ion.

**Data Quality Objective (DQO)** -- The requirements established to maintain the quality of the data being collected.

**Data Validation** -- Data validation is based on Region-defined criteria and limits, professional judgment of the data validator, and (if available) the Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP).

**Duplicate** -- Sample required by the laboratory's contract to check the accuracy and precision of inorganic analyses. It is a second aliquot of the same sample to determine the precision of the method.

**Equipment Blank** -- A sample used to check field decontamination procedures. See Field Blank.

**Field Blank** -- Any blank sample that is submitted from the field. Each field blank is assigned its own unique USEPA Sample number. A field blank checks for cross-contamination during sample collection, sample shipment, and in the laboratory. A field blank includes trip blanks, rinse blanks, equipment blanks, etc.

**Field Duplicate** -- Checks reproducibility of laboratory and field procedures and indicates non-homogeneity.

**Field Operations and Record Management System (FORMS) II Lite** -- A stand-alone, Windows-based software application that enables samplers to automatically create and generate sample documentation both prior to and during a sampling event.

**Field QC Sample** -- Used to detect for contamination or error in the field.

**Field Sample** -- Primary sample material taken out in the field from which other samples, such as duplicates or split samples are derived. A field sample can be prepared in the field and sent for analysis in one or multiple containers, and is identified by a unique USEPA Sample number.

**Field Sampling Plan (FSP)** -- Developed to outline the actual steps and requirements pertaining to a particular sampling event, and explains, in detail, each component of the event to all involved samplers.

**Holding Time** -- The elapsed time expressed in hours, days, or months from the date of collection of the sample until the date of its analysis.

**Contractual** -- The maximum lengths of time that the CLP laboratory can hold samples prior to extraction and/or analysis, and are described in the CLP analytical services Statements of Work (SOWs).

**Technical** -- The maximum lengths of time that samples may be held from time of collection to time of preparation and/or analysis and still be considered valid.

**Laboratory Blank** -- See Method Blank.

**Laboratory Duplicate** -- A sample required by the laboratory's contract to check the precision of inorganic analyses.

**Laboratory QC Sample** -- An additional volume of an existing sample, as required by the laboratory's contract, used to detect contamination or error in the laboratory's practices.

**Matrix** -- The predominant material of which a sample to be analyzed is composed.

**Matrix Spike (MS)** -- Sample required by the laboratory's contract to check the accuracy of organic and inorganic analyses. It is an aliquot of a sample (water or soil) that is fortified (spiked) with known quantities of a specific compound and subjected to the entire analytical procedure. See Matrix Spike Duplicate.

**Matrix Spike Duplicate (MSD)** -- Sample required by the laboratory's contract to check the accuracy and precision of organic analyses. It is a second aliquot of the same matrix as the Matrix Spike (MS) that is spiked to determine the precision of the method. See Matrix Spike.

**Method Blank** -- An analytical control consisting of all reagents, internal standards and surrogate standards [or System Monitoring Compounds (SMCs) for volatile organic analysis], that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background, and reagent contamination, also referred to as laboratory blank when defining the level of laboratory contamination.

**Modified Analysis** -- A change in the technical requirements that fall outside the scope of the Statement of Work (SOW).

**Performance Evaluation (PE) Sample** -- A sample of known composition provided by the USEPA for contractor analysis. Used by USEPA to evaluate contractor performance.

**Pesticides** -- Substances intended to repel, kill, or control any species designated a "pest," including weeds, insects, rodents, fungi, bacteria, and other organisms. Under the CLP, only organochlorine pesticides are analyzed (e.g., DDT, Dieldrin, Endrin, etc.).

**Polychlorinated Biphenyls (PCBs)** -- A group of toxic, persistent chemicals used in electrical transformers and capacitors for insulating purposes, and in gas pipeline systems as a lubricant. The sale and new use of PCBs were banned by law in 1979.

**Quality Assurance (QA)** -- An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

**Quality Assurance Project Plan (QAPP)** -- Document written to meet requirements outlined in the document *EPA Guidance for Quality Assurance Project Plans* (EPA QA/R-5). Prepared in advance of field activities and used by samplers to develop any subsequent plans such as the Sampling Analysis Plan (SAP) or the Field Sampling Plan (FSP).

**Quality Control (QC)** -- The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality.

**Regional Sample Control Center (RSCC) Coordinator** -- In most Regions, coordinates sampling efforts and serves as the central point-of-contact for sampling questions and problems. Also assists in coordinating the level of Regional sampling activities to correspond with the monthly projected demand for analytical services.

**Regional Site Manager** -- Coordinates the development of data quality objectives and oversees project-specific remedial or removal contractors, State officials, or private parties conducting site sampling efforts.

**Rinse Blank** -- A sample used to check decontamination procedures. Also see Field Blank.

**Routine Analytical Service (RAS)** -- The standard inorganic and organic analyses available through the CLP.

**Sample** -- A discrete portion of material to be analyzed that is contained in single or multiple containers, and identified by a unique Sample number.

**Sample Delivery Group (SDG)** -- A unit within a sample Case that is used to identify a group of samples for delivery. An SDG is defined by the following, whichever is most frequent:

- Each Case of field samples received; or
- Each 20 field samples (excluding PE samples) within a Case; or
- Each 7 calendar day period (3 calendar day period for 7-day turnaround) during which field samples in a Case are received (said period beginning with the receipt of the first sample in the SDG).

In addition, all samples and/or sample analyses assigned to an SDG must have been scheduled under the same contractual turnaround time. Preliminary Results have no impact on defining the SDG. Sample may be assigned to SDGs by matrix (e.g., all soil samples in one SDG, all water samples in another) at the discretion of the laboratory.

**Sample Label** -- An identification label attached to a sample bottle or container to identify the sample.

**Sample Number** -- A unique number used to identify and track a sample. This number can be recorded on a sample label or written on the sample bottle or container using indelible ink.

**Sample Tag** -- A tag attached to a sample that identifies the sample and maintains chain-of-custody.

**Sampling Analysis Plan (SAP)** -- A document that explains how samples are to be collected and analyzed for a particular sampling event.

**Scribe** -- A stand-alone Windows-based desktop application that samplers can use to automatically create and generate sample documentation prior to and during sampling events.

**Semivolatile Organic Analyte (SVOA)** -- A compound amenable to analysis by extraction of the sample using an organic solvent.

**Standard Operating Procedure (SOP)** -- A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps, and that is officially approved as the methods for performing certain routine or repetitive tasks.

**Statement of Work (SOW)** -- A document that specifies how laboratories analyze samples under a particular Contract Laboratory Program (CLP) analytical program.

**Superfund** -- The program operated under the legislative authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA), that funds and carries out USEPA removal and remedial activities at hazardous waste sites. These activities include establishing the National Priorities List (NPL), investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions.

**Superfund Amendments and Reauthorization Act (SARA)** -- The 1986 amendment to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

**Traffic Report/Chain of Custody (TR/COC) Record** -- A record that is functionally similar to a packing slip that accompanies a shipment of goods. Used as physical evidence of sample custody and functions as a permanent record for each sample collected.

**Trip Blank** -- A sample used to check for contamination during sample handling and shipment from field to laboratory. Also see Field Blank.

**Volatile Organic Analyte (VOA)** -- A compound amenable to analysis by the purge-and-trap technique. Used synonymously with the term purgeable compound.



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## Appendix G: FORMS II Lite Analysis Codes

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Analysis Name	Abbreviation
Aluminum	Al
Antimony	Sb
Arsenic	As
Barium	Ba
Beryllium	Be
Cadmium	Cd
Calcium	Ca
Chromium	Cr
CLP TAL Total Metals ICP-MS	ICP/MS
CLP TAL Total Metals/ICP-AES	ICP-AES
CLP TCL Aroclors	CLP ARO
CLP TCL Pesticides	CLP PEST
CLP TCL Semivolatiles	CLP SVOA
CLP TCL Semivolatiles-SIM	CLP SVSIM
CLP TCL Trace Volatiles	CLP TVOA
CLP TCL Trace Volatiles-SIM	CLP TVSIM
CLP TCL Volatiles	CLP VOA
Cobalt	Co
Copper	Cu
Cyanide	CN
Iron	Fe
Lead	Pb
Magnesium	Mg
Manganese	Mn
Mercury	Hg
Nickel	Ni
Potassium	K
Selenium	Se
Silver	Ag
Sodium	Na
Thallium	Tl
Vanadium	V
Zinc	Zn



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## Appendix H: Scribe CLP Analysis Codes

Analysis Name	Abbreviation
CLP Aluminum	Al
CLP Antimony	Sb
CLP Arsenic	As
CLP Barium	Ba
CLP Beryllium	Be
CLP Cadmium	Cd
CLP Calcium	Ca
CLP Chromium	Cr
CLP Cobalt	Co
CLP Copper	Cu
CLP Iron	Fe
CLP Lead	Pb
CLP Magnesium	Mg
CLP Manganese	Mn
CLP Nickel	Ni
CLP Potassium	K
CLP Selenium	Se
CLP Silver	Ag
CLP Sodium	Na
CLP TAL Dissolved Metals	DM
CLP TAL Total Metals	TM
CLP TAL Total Metals (No Hg)	TM (No Hg)
CLP TAL Total Metals and Cyanide	TM/CN
CLP TAL Total Metals ICP/MS	ICP/MS
CLP Thallium	Tl
CLP Vanadium	V
CLP Zinc	Zn
CLP TCL Pesticide/PCBs	PEST
CLP TCL Semivolatiles	BNA
CLP TCL Semivolatiles and Pesticides/PCBs	BNA/PEST
CLP TCL Volatiles	VOA

The Scribe CLP Analysis Codes provided may cause a delay in processing at the CLP laboratories based on interpretation. **Samplers are advised to use the analysis codes provided in Appendix G: FORMS II Lite Analysis Codes for CLP analysis.**



Scribe users are advised to contact the ERT Software Support Help Desk at 800-999-6990 for assistance in adding the custom analysis onto Scribe, please contact or refer to the following Web site:

<http://www.epaossc.org/Scribe>

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**APPENDIX B**  
**SITE-SPECIFIC DATA QUALITY OBJECTIVES**

**DATA QUALITY OBJECTIVE NO. 1**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: WASTE/ WASTE SOIL SOURCE**

**STEP 1. STATE THE PROBLEM**

Contaminants may be present within impoundments at Delta Shipyard representing a threat to human health and the environment.

**STEP 2. IDENTIFY THE DECISION**

Waste source samples will be collected from the three open impoundments and two historical backfilled impoundments to (1) identify the source areas (2) classify the source type (3) identify the contaminants of concern (COCs) associated with each source area or area of observed contamination (4) calculate the hazardous waste quantity for each source.

IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.

- If COCs identified in waste samples are CERCLA hazardous substances as defined in CERCLA Sections 101(14) and 101(33), then the source area has been established/characterized and COCs can contribute to Hazard Ranking System (HRS) evaluation.
- If no COCs in the waste samples are CERCLA hazardous substances as defined in CERCLA Sections 101(14) and 101(33), then the source area has not been established/characterized and the waste represented by the samples will not require additional attention.

**STEP 3. IDENTIFY INPUTS TO THE DECISION**

IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.

- Review historical site operations contributing to contamination.
- Contaminant concentrations in waste samples collected during sampling.

IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.

- Waste sample locations as shown in Figure 3-1.
- Analytical results from the laboratory analyses specified below.

BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.

Waste source samples will be used to establish source COCs in order to attribute potential releases from the Site to the surface water pathway (DQO No. 3)

IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.

- Volatile Organic Compounds (VOCs) by SW846 8260B
- Semivolatile Organic Compounds (SVOCs) by SW846 8270C
- Pesticides by SW846 8081B
- Polychlorinated Biphenyls by SE846 8082A
- Herbicides by SW846 8151A
- Total Analyte List (TAL) Metals by SW-846 Method 6010C
- Mercury by SW-846 Method 7471B

**STEP 4. DEFINE THE BOUNDARIES OF THE STUDY**

DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.

Waste within the 3 impoundments (pits) located within Delta Shipyard.

SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.

Contaminant concentrations in waste samples.

DEFINE THE SCALE OF DECISION MAKING.

Results of waste source samples will be used to establish source COCs in order to attribute potential releases from the Site to the surface water pathway including contribution to the HRS evaluation.

DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.

The data will apply until the waste soil represented by the sample receives appropriate response actions.

**DATA QUALITY OBJECTIVE NO. 1**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: WASTE/WASTE SOIL SOURCE (continued)**

<b>STEP 4. DEFINE THE BOUNDARIES OF THE STUDY (Continued)</b>	
DETERMINE WHEN TO COLLECT DATA.	Samples will be collected during the START-3 field effort and prior to HRS evaluation.
IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	<ul style="list-style-type: none"> <li>• Inclement weather.</li> <li>• Access not attainable.</li> </ul>
<b>STEP 5. DEVELOP A DECISION RULE</b>	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	Detection of COCs in the waste samples by an analytical testing to confirm in CERCLA Sections 101(14) and 101(33) hazardous substances.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	<p>If the COCs identified in the waste samples are CERCLA hazardous substances as defined in CERCLA Sections 101(14) and 101(33), then the source area has been established/characterized.</p> <p>If no COCs are identified in the waste samples then the source area has NOT been established/characterized and the waste represented by the samples will not require additional attention.</p>
<b>STEP 6. SPECIFY LIMITS ON DECISION ERRORS</b>	
DEVELOP A DECISION RULE.	If waste sample is defined as a hazardous substance [CERCLA Sections 101(14) and 101(33)], then the source area has been established/characterized.
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from 0 µg/mg to more than the contaminant-specific action level.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	<p><u>Type I Error:</u> Deciding that the specified area represented by the waste sample does not exceed the specified assessment level when, in truth, the waste soil concentration of the contaminant exceeds its specified assessment level. The consequence of this decision error is that contaminated waste soil will remain in place, possibly endangering human health and the environment. This decision error is more severe.</p> <p><u>Type II Error:</u> Deciding that the specified area represented by the waste sample does exceed the specified assessment level when, in truth, it does not. The consequences of this decision error are that remediation of the waste soil will continue and unnecessary costs will be incurred.</p>
ESTABLISH THE TRUE STATE OF NATURE FOR EACH DECISION RULE.	<p>The true state of nature when the waste is decided to be below the specified assessment levels when in fact, it is not below the specified assessment levels, is that the waste does need remedial action.</p> <p>The true state of nature when the waste is decided to be above the specified assessment levels when in fact, it is not above the specified assessment levels, is that the waste does not need remedial action.</p>

**DATA QUALITY OBJECTIVE NO. 1**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: WASTE / WASTE SOIL SOURCE (continued)**

<b>STEP 6. SPECIFY LIMITS ON DECISION ERRORS (Continued)</b>	
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS ( $H_0$ ) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS ( $H_a$ ).	<p><math>H_0</math>: The waste represented by the sample is above the specified action level.</p> <p><math>H_a</math>: The waste represented by the sample is below the specified action level.</p>
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	<ul style="list-style-type: none"> <li>False Positive Error = Type I</li> <li>False Negative Error = Type II</li> </ul>
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	To be assigned based on discussions with EPA SAM.
<b>STEP 7. OPTIMIZE THE DESIGN</b>	
REVIEW THE DQOs.	Due to insufficient historical data, determination of the standard deviation was not possible. Therefore, sample size calculation using the traditional statistical formula may not be the optimal design. In order to select the optimal sampling program that satisfies the DQOs and is the most resource effective, other elements were considered.
<p>DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN.</p> <p>A total of five waste / waste soil source samples will be collected from the impoundments (pits) located within Delta Shipyard and analyzed to determine the presence of hazardous substances as defined by CERCLA, waste source characterization, and to show potential attribution to the pathways of concern used for HRS evaluation. The samples will be analyzed for VOCs, SVOCs, Pesticides, PCBs, Herbicides, TAL metals, and mercury.</p>	

**DATA QUALITY OBJECTIVE NO. 2**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: SOIL/SEDIMENT**

<b>STEP 1. STATE THE PROBLEM</b>	
To find if contaminants have migrated from the source impoundments located in Delta Shipyard to the surface water pathway through overland flow.	
<b>STEP 2. IDENTIFY THE DECISION</b>	
Soil/sediment samples will be collected from 10 locations around the impoundment source to identify if contaminants identified within the source have migrated from the source to the surface water pathway, substantiating attribution.	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	<ul style="list-style-type: none"> <li>• If COCs identified in soil/sediment samples are the CERCLA hazardous substances found within the source, then attribution to the surface water pathway has been established and COCs can contribute to Hazard Ranking System (HRS) evaluation.</li> <li>• If no COCs in the soil/sediment samples then attribution has not been established and the soil represented by the samples will not require additional attention.</li> </ul>
<b>STEP 3. IDENTIFY INPUTS TO THE DECISION</b>	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	<ul style="list-style-type: none"> <li>• Review historical site operations contributing to contamination.</li> <li>• Contaminant concentrations in soil/sediment samples collected during sampling.</li> </ul>
IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	<ul style="list-style-type: none"> <li>• Soil/sediment sample locations as shown in Figure 3-1.</li> <li>• Analytical results from the laboratory analyses specified below.</li> </ul>
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	Soil/sediment source samples will be used to determine an area of observed contamination and attribution to the surface water pathway (DQO No. 3)
IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	<ul style="list-style-type: none"> <li>• Volatile Organic Compounds (VOCs) by SW846 8260B</li> <li>• Semivolatile Organic Compounds (SVOCs) by SW846 8270C</li> <li>• Pesticides by SW846 8081B</li> <li>• Polychlorinated Biphenyls by SE846 8082A</li> <li>• Herbicides by SW846 8151A</li> <li>• Total Analyte List (TAL) Metals by SW-846 Method 6010C</li> <li>• Mercury by SW-846 Method 7471B</li> </ul>
<b>STEP 4. DEFINE THE BOUNDARIES OF THE STUDY</b>	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	Soil/sediment locations at Delta Shipyard around the source, within drainage ditches and between the source and the surface water pathway.
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Contaminant concentrations in soil/sediment samples.
DEFINE THE SCALE OF DECISION MAKING.	Results of soil/sediment samples will be used to determine attribution to the site and surface water pathway including contribution to the HRS evaluation.
DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The data will apply until the soil/sediment represented by the sample receives appropriate response actions.

**DATA QUALITY OBJECTIVE NO. 2**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: SOIL/SEDIMENT (continued)**

<b>STEP 4. DEFINE THE BOUNDARIES OF THE STUDY (Continued)</b>	
DETERMINE WHEN TO COLLECT DATA.	Samples will be collected during the START-3 field effort and prior to HRS evaluation.
IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	<ul style="list-style-type: none"> <li>• Inclement weather.</li> <li>• Access not attainable.</li> </ul>
<b>STEP 5. DEVELOP A DECISION RULE</b>	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	Detection of COCs in the soil/sediment samples by analytical testing to confirm CERCLA Sections 101(14) and 101( 33) hazardous substances.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	<p>If the COCs identified in the soil/sediment samples are the same CERCLA hazardous substances as found in the source, then attribution to the surface water pathway has been established.</p> <p>If no COCs are identified in the soil/sediment samples then attribution to the surface water pathway has not been established and the soil/sediment represented by the samples will not require additional attention.</p>
<b>STEP 6. SPECIFY LIMITS ON DECISION ERRORS</b>	
DEVELOP A DECISION RULE.	If soil/sediment sample is defined as a hazardous substance [CERCLA Sections 101(14) and 101(33)] found in the source, then attribution has been established.
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from 0 µg/mg to more than the contaminant specific action level.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	<p><u>Type I Error:</u> Deciding that the specified area represented by the soil/sediment sample does not exceed the specified assessment level when, in truth, the soil/sediment concentration of the contaminant exceeds its specified assessment level. The consequence of this decision error is that contaminated soil/sediment will remain in place, possibly endangering human health and the environment. This decision error is more severe.</p> <p><u>Type II Error:</u> Deciding that the specified area represented by the soil/sediment sample does exceed the specified assessment level when, in truth, it does not. The consequences of this decision error are that remediation of the soil/sediment will continue and unnecessary costs will be incurred.</p>
ESTABLISH THE TRUE STATE OF NATURE FOR EACH DECISION RULE.	<p>The true state of nature when the soil/sediment is decided to be below the specified assessment levels when in fact, it is not below the specified assessment levels, is that the soil/sediment does need remedial action.</p> <p>The true state of nature when the soil/sediment is decided to be above the specified assessment levels when in fact, it is not above the specified assessment levels, is that the soil/sediment does not need remedial action.</p>

**DATA QUALITY OBJECTIVE NO. 2**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: SOIL/SEDIMENT (continued)**

<b>STEP 6. SPECIFY LIMITS ON DECISION ERRORS (Continued)</b>	
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS ( $H_0$ ) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS ( $H_a$ ).	<p><math>H_0</math>: The waste represented by the sample is above the specified action level.</p> <p><math>H_a</math>: The waste represented by the sample is below the specified action level.</p>
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	<ul style="list-style-type: none"> <li>False Positive Error = Type I</li> <li>False Negative Error = Type II</li> </ul>
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	To be assigned based on discussions with EPA SAM.
<b>STEP 7. OPTIMIZE THE DESIGN</b>	
REVIEW THE DQOs.	Due to insufficient historical data, determination of the standard deviation was not possible. Therefore, sample size calculation using the traditional statistical formula may not be the optimal design. In order to select the optimal sampling program that satisfies the DQOs and is the most resource effective, other elements were considered.
<p>DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN.</p> <p>A total of thirteen (one duplicate) soil/sediment samples will be collected from around the source impoundments, within ditches and between the impoundments and the surface water pathway and analyzed to determine the presence of hazardous substances as defined by CERCLA associated with the waste source, and to establish attribution of the sources to the surface water pathway used for HRS evaluation. The samples will be analyzed for VOCs, SVOCs, Pesticides, PCBs, Herbicides, TAL metals, and mercury.</p>	

**DATA QUALITY OBJECTIVE NO. 3**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: SURFACE WATER AND/OR SEDIMENT**

<b>STEP 1. STATE THE PROBLEM</b>	
Determining if surface water/sediment samples collected from the surface water pathway are above three times the maximum background concentrations resulting in an observed release.	
<b>STEP 2. IDENTIFY THE DECISION</b>	
Are the concentrations of chemicals of concern in surface water/sediment, represented by a sample, above three times the maximum background concentrations?	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	<ul style="list-style-type: none"> <li>• If any contaminant exceeds three times the background concentrations in the surface water/sediment, the surface water/sediment represented by that sample will be considered contaminated and will require additional attention.</li> <li>• If no contaminants exceed three times the background concentrations in the surface water/sediment, the surface water/sediment represented by that sample will not require additional attention.</li> </ul>
<b>STEP 3. IDENTIFY INPUTS TO THE DECISION</b>	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	<ul style="list-style-type: none"> <li>• Contaminant concentrations in surface water/sediment samples collected from the surface water pathway (Figure 3-1).</li> </ul>
IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	<ul style="list-style-type: none"> <li>• Surface water/sediment samples from the surface water pathway.</li> <li>• Analytical results from the laboratory analyses specified below.</li> </ul>
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	The site specific screening levels will be three times the maximum background concentrations.
IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	<ul style="list-style-type: none"> <li>• Grab surface water/sediment samples from the surface water pathway analyzed for:</li> <li>• Volatile Organic Compounds (VOCs) by SW846 8260B</li> <li>• Semivolatile Organic Compounds (SVOCs) by SW846 8270C</li> <li>• Pesticides by SW846 8081B</li> <li>• Polychlorinated Biphenyls by SE846 8082A</li> <li>• Herbicides by SW846 8151A</li> <li>• Total Analyte List (TAL) Metals by SW-846 Method 6010C</li> <li>• Mercury by SW-846 Method 7471B</li> </ul>
<b>STEP 4. DEFINE THE BOUNDARIES OF THE STUDY</b>	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	The proposed surface water/sediment sample locations are shown in Figure 3-1.
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Contaminant concentrations in surface water/sediments at the sample locations.
DEFINE THE SCALE OF DECISION MAKING.	The scale of decision will be for the site activities occurring at the time of the sample collection.
DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The analytical data will apply until the surface water/sediment represented by the sample receives appropriate response action.

**DATA QUALITY OBJECTIVE NO. 3**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: SURFACE WATER AND/OR SEDIMENT (continued)**

<b>STEP 4. DEFINE THE BOUNDARIES OF THE STUDY (Continued)</b>	
DETERMINE WHEN TO COLLECT DATA.	Surface water/sediment samples will be collected during the field sampling activities.
IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	<ul style="list-style-type: none"> <li>• Inclement weather.</li> <li>• Access not attainable.</li> </ul>
<b>STEP 5. DEVELOP A DECISION RULE</b>	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	The sample concentrations at each sample location will be compared to three times the maximum background concentrations.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	The site specific screening levels will be three times the maximum background concentrations.
DEVELOP A DECISION RULE.	If any result in a surface water/sediment sample is above three times the maximum background concentrations, then the surface water/sediment represented by that sample will require additional attention, otherwise the surface water/sediment does not require additional attention. Additional attention means more sampling, surface water/sediment collection and treatment, or other action deemed necessary by EPA.
<b>STEP 6. SPECIFY LIMITS ON DECISION ERRORS</b>	
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from 0 mg/L or mg/kg for surface water/sediment to more than three times the maximum background concentrations.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	<p><u>Type I Error:</u> Deciding that the specified area represented by the surface water/sediment sample does not exceed three times the maximum background concentrations when, in truth, the surface water/sediment concentration of the contaminant exceeds three times the maximum background concentrations. The consequence of this decision error is that contaminated surface water/sediment will remain in place, possibly endangering human health and the environment. This decision error is more severe.</p> <p><u>Type II Error:</u> Deciding that the specified area represented by the surface water/sediment sample does exceed three times the maximum background concentrations when, in truth, it does not. The consequences of this decision error are that remediation of the surface water/sediment will continue and unnecessary costs will be incurred.</p>

**DATA QUALITY OBJECTIVE NO. 3**  
**DELTA SHIPYARD**  
**MEDIA OF CONCERN: SURFACE WATER AND/OR SEDIMENT (continued)**

<b>STEP 6. SPECIFY LIMITS ON DECISION ERRORS (Continued)</b>	
ESTABLISH THE TRUE STATE OF NATURE FOR EACH DECISION RULE.	<p>The true state of nature when the surface water/sediment is decided to be below three times the maximum background concentrations when in fact, it is not below three times the maximum background concentrations, is that the surface water/sediment does need remedial action.</p> <p>The true state of nature when the surface water/sediment is decided to be above three times the maximum background concentrations when in fact, it is not above three times the maximum background concentrations, is that the surface water/sediment does not need remedial action.</p>
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS ( $H_0$ ) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS ( $H_a$ ).	<p><math>H_0</math>: The surface water/sediment represented by the sample is above three times the maximum background concentrations.</p> <p><math>H_a</math>: The surface water/sediment represented by the sample is below three times the maximum background concentrations.</p>
ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	<ul style="list-style-type: none"> <li>False Positive Error = Type I</li> <li>False Negative Error = Type II</li> </ul>
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	The assignment of probability values is not applicable to these DQOs because a nonprobabilistic (judgment-based) process has been specified.
<b>STEP 7. OPTIMIZE THE DESIGN</b>	
REVIEW THE DQOs.	Surface water/sediment sample locations were selected based on the location of on-site waste source areas and proximity of the probable point of entry (PPEs) along the surface water pathway.
<p>DEVELOP GENERAL SAMPLING AND ANALYSIS DESIGN.</p> <p>A total of 17 surface water/ sediment samples (including 2 duplicates) will be collected from along the surface water pathway downstream and upstream of the Site location. The samples will be analyzed for VOCs, SVOCs, Pesticides, PCBs, Herbicides, total metals, and mercury.</p>	

**APPENDIX C**

**WESTON AND ERT STANDARD OPERATING PROCEDURES**

<b>SOP</b>	<b>1001.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Surface Soil Sampling				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1001-01.DOC	<b>PAGE</b>	1 of 3

## INTRODUCTION

The following Standard Operating Procedure (SOP) is to describe the procedures for collecting representative soil samples. Analysis of soil samples may determine whether concentrations of specific soil pollutants exceed established action levels, or if the concentrations of soil pollutants present a risk to public health, welfare, or the environment. This SOP is similar to SOP Number 1001.03 for collecting near surface soil samples with a hand auger.

## PROCEDURE

Surface soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed versus undisturbed), and the type of soil. Near-surface soils may be easily sampled using a spade, trowel, or hand scoop.

### Sample Preservation

Cooling to  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , supplemented by a minimal holding time, is suggested.

### Interferences and Potential Problems

There are two primary interferences or potential problems associated with soil sampling: cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated (disposable) sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results. Homogenization may also affect sample representativeness where the analytical requirements include volatile organic compounds.

### Equipment or Apparatus

The equipment used for sampling may be selected from the following list, as appropriate:

- Tape measure
- Survey stakes or flags
- Stainless steel, plastic, or other appropriate homogenization bucket or bowl
- Ziploc plastic bags
- Logbook
- Labels
- Chain-of-custody forms and seals
- Coolers
- Ice
- Decontamination supplies and equipment
- Canvas or plastic sheet
- Spatulas/spades/shovels
- Scoops

<b>SOP</b>	<b>1001.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Surface Soil Sampling				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1001-01.DOC	<b>PAGE</b>	2 of 3

- Plastic or stainless steel spoons
- Trowel

### Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and what equipment and supplies are required.
2. Obtain necessary sampling and monitoring equipment from the list above.
3. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.
4. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.
5. Decontaminate or preclean equipment, and ensure that it is in working order.
6. Use stakes, buoys, or flagging to identify and mark all sampling locations. Consider specific site factors, including extent and nature of contaminant, when selecting sample locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations will be utility-cleared by the property owner or other responsible party prior to soil sampling.
7. Evaluate safety concerns associated with sampling that may require use of personal protective equipment and/or air monitoring.

### Surface Soil Sample Collection

Collect samples from the near-surface soil with tools such as spades, shovels, and scoops. Surface material can be removed to the required depth with this equipment, then a stainless steel or plastic scoop can be used to collect the sample. The use of a flat, pointed mason trowel to cut a block of the desired soil can be helpful when undisturbed profiles are required. A stainless steel scoop, lab spoon, or plastic spoon will suffice in most other applications. Avoid the use of devices plated with chrome or other target analyte materials.

The following procedures should be followed when collecting surface soil samples:

1. Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.
2. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard a thin layer of soil from the area which came in contact with the spade.
3. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or if composite samples are to be collected, place a sample from another sampling interval into the

<b>SOP</b>	<b>1001.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Surface Soil Sampling				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1001-01.DOC	<b>PAGE</b>	3 of 3

homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled container(s) and secure the cap(s) tightly.

4. Fill hole created through sampling with unused material or other appropriate backfill material (sand).
5. Record applicable information into field log book or appropriate forms as documentation of sampling.

<b>SOP</b>	<b>1001.04</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Sampling of Stockpiled Soil				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1001-04.DOC	<b>PAGE</b>	1 of 1

## INTRODUCTION

The following Standard Operating Procedure (SOP) describes the procedure for collecting representative samples of stockpiled soil. Representative soil samples may be collected for analysis to determine whether concentrations of specific soil pollutants exceed established action levels, or if the concentrations of soil pollutants present a risk to public health and welfare, or the environment. Soil samples are also typically collected from stockpiles for classification prior to entry into a soil treatment process or offsite disposal, or after treatment to verify the effectiveness of the treatment system. This soil sampling procedure is closely related to SOP Nos. 1001.01, 1001.03, and 1001.10 regarding soil sampling procedures.

## PROCEDURE

Stockpiles will be sampled as follows:

- Soil may be collected from the surface of a stockpile using the surface soil sampling procedure (SOP 1001.01) or from deeper within the stockpile according to the hand augering procedure (SOP 1001.03) as appropriate to obtain the required soil material. The procedure to be used to physically collect soil samples from stockpiles are described in SOP Nos. 1001.01, 1001.03, and 1001.10 (soil compositing). Reference should be made to these SOPs for specific sampling equipment, procedures, and other general guidelines. Equipment that may be used as part of the soil compositing procedure is identified under SOP Nos. 1001.01 and 1001.03 where general soil sampling methods are described.
- Each project may have different stockpile sampling objectives and requirements. Therefore, the sampling of stockpiles should be addressed in a site-specific Sampling and Analysis Plan and the soil sampling implemented in accordance with this plan.
- Samples may be collected from discrete locations in a pile and submitted for laboratory analysis, as described in SOP Nos. 1001.01 and 1001.03. More typical is that several samples from a single stockpile will be collected and composited to prepare a single sample for laboratory analysis. Collecting composite samples from a stockpile is recommended and will generally be performed to better characterize the soil in the pile. The number of samples to collected from a stockpile and composite will depend on the size of the stockpile and the particular requirements of the project. Typically compositing for characterization purposes is on the order of 1 composite soil sample for every 50 cubic yards. Compositing will be performed in accordance with SOP 1001.10.

## REFERENCES

SOP No. 1001.01 - Standard Operating Procedure, Surface Soil Sampling  
SOP No. 1001.03 - Standard Operating Procedure, Shallow Subsurface and Near Surface Soil Sampling  
SOP No. 1001.10 - Standard Operating Procedure, Soil Compositing

<b>SOP</b>	<b>1001.10</b>				
<b>GROUP</b>	Soil Sampling Procedures				
<b>SUB-GROUP</b>					
<b>TITLE</b>	Soil Compositing				
<b>DATE</b>	2/23/2010	<b>FILE</b>	1001-10.DOC	<b>PAGE</b>	1 of 2

## INTRODUCTION

The following Standard Operating Procedure (SOP) describes the procedure for compositing soil samples. Soil samples are typically collected for laboratory analysis, and sometimes it is necessary to composite (mix together) samples from several locations for one combined analysis at the laboratory. This soil sampling procedure is closely related to SOP Nos. 1001.01, 1001.03, and 1001.10 regarding soil sampling procedures. This procedure serves as an alternative method of sample preparation prior to placing the samples in containers, as described in the other named SOPs.

## PROCEDURE

### Equipment

Equipment that may be used as part of the soil compositing procedure is identified under SOP Nos. 1001.01 and 1001.03 where soil sampling methods are described. Specific equipment typically used during the compositing process after discrete samples are collected includes:

- Mixing bowls or buckets
- Scoops, spatulas, and knives
- Sample containers
- Personal protection clothing
- Plastic Sheeting
- Decontamination equipment and supplies

### Method

The procedure to be used to physically collect soil samples are described in SOP Nos. 1001.01 and 1001.03. Reference should be made to these SOPs for specific sampling equipment, procedures, and other general guidelines. As soil samples are collected, the site-specific Sampling and Analysis Plan may required compositing (mixing together) of two or more samples to create a single sample that will be sent to the laboratory for analysis. When this is the case, the following compositing procedure will generally be used:

- The soil will be collected in general accordance with SOP 1001.01 or 1001.03, with the exception that samples from discrete locations will generally not be immediately placed into sample containers and an additional preparation step (i.e., compositing) will be performed.
- As they are collected, soil samples selected for compositing will be staged in a clean mixing bowl or mixing bucket until each sample to be included in the composite sample is obtained. Depending on site requirements and analytical procedures to be requested, it may be necessary to temporarily stage individual discrete-location samples within clean sample jars, aluminum foil, or other appropriate materials for the project. The method for sample staging should be specified in the site-specific sampling and analysis plan.

<b>SOP</b>	<b>1001.10</b>				
<b>GROUP</b>	Soil Sampling Procedures				
<b>SUB-GROUP</b>					
<b>TITLE</b>	Soil Compositing				
<b>DATE</b>	2/23/2010	<b>FILE</b>	1001-10.DOC	<b>PAGE</b>	2 of 2

- For composite samples that will be analyzed for volatile organic compounds, an equal portion of soil will be removed directly from each discrete-location sample and placed into a final sample jar without homogenizing the soil.
- For analyses other than volatile organics, equal portions of soil will be removed from each discrete-location sample and placed in a clean mixing bowl. The equal portions of the samples will then be broken up and homogenized together using a scoop or spatula. Homogenization will generally continue until the discrete samples being combined are reasonably indistinguishable as individual individual samples in the soil mixture. However, it is recognized that homogenization can be difficult for highly plastic clays. In this case, equal amounts of the the soil core of each clay sample will be cut into small, roughly cubical pieces using a stainless steel knife, and an equal numbers of pieces of each discrete sample will be placed into the bowl and homogenized to extent practical.
- The composited soil sample will be collected from the mixing bowl containing the individual homogenized samples after homogenization is performed. The composited sample will be collected using a stainless steel or disposable plastic scoop or similar tool. The sample will be placed in a clean sample container and then handled in accordance with soil sampling SOPs 1001.01 and 1001.03.

Variations on this procedure are allowable to accomodate different soil conditions and any site requirements specifically identified in the site-specific Sampling and Analysis Plan.

The number of discrete samples that may be composited into a single sample typically ranges from two to six. The number of discrete samples that may be composited for the project in question will be specified in the site-specific Sampling and Analysis Plan.

## REFERENCES

SOP No. 1001.01 - Standard Operating Procedure, Surface Soil Sampling

SOP No. 1001.03 - Standard Operating Procedure, Shallow Subsurface and Near Surface Soil Sampling

<b>SOP</b>	<b>1002.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Surface Water				
<b>TITLE</b>	Surface Water Sampling				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1002-01.DOC	<b>PAGE</b>	1 of 3

## INTRODUCTION

The following Standard Operating Procedure (SOP) is to describe the procedures for collecting representative surface water samples. Analysis of surface samples may determine whether concentrations of specific soil pollutants exceed established action levels, or if the concentrations of pollutants present a risk to public health, welfare, or the environment.

## PROCEDURE

Surface water samples may be collected using a variety of methods and equipment. The methods and equipment used are usually dependent on the location of the body of water being sampled. Sampling can be performed by merely submerging the sample container, a weighted-bottle sampler with stopper, a bailer, or by pump assisted methods. Several types of pumps can be used for sampling depending on the objectives of sampling and the site conditions.

### Sample Preservation

Samples are to be preserved in conformance with the site-specific Quality Assurance Project Plan, Sampling and Analysis Plan or work plan. In general these requirements include refrigeration to 4°C, addition of appropriate additives (HCl, H<sub>2</sub>SO<sub>4</sub>, NaOH) to adjust and fix pH, and a defined maximum holding time. If a site-specific plan is not available, the analytical laboratory should be consulted for the appropriate preservation procedures.

### Interferences and Potential Problems

There are two primary interferences or potential problems associated with surface water sampling: cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, undue disturbance of the sample matrix, or improper sample location.

### Equipment or Apparatus

- Ziploc plastic bags
- Logbook
- Labels
- Chain-of-custody forms and seals
- Coolers
- Ice
- Decontamination supplies and equipment
- Discharge tubing
- Sample containers
- Sampling devices

<b>SOP</b>	<b>1002.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Surface Water				
<b>TITLE</b>	Surface Water Sampling				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1002-01.DOC	<b>PAGE</b>	2 of 3

### Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are required.
2. Obtain necessary sampling and monitoring equipment.
3. Decontaminate or preclean equipment, and ensure that it is in working order.
4. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.
5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.

### Surface Water Sampling

Samples from shallow depths can be readily collected by merely submerging the sample container. In flowing surface water bodies, the container's mouth should be positioned so that it faces upstream, while the sampling personnel stand downstream so as not to stir up sediment that could potentially contaminate the sample.

Collecting a representative sample from a larger body of surface water requires that samples be collected near the shore unless boats are feasible and permitted. If boats are used, the body of water should be cross sectioned, and samples should be collected at various depths across the body of water in accordance with the specified sampling plan. For this type of sampling, a weighted-bottle sampler is used to collect samples at a predetermined depth. The sampler consists of a glass bottle, a weighted sinker, a bottle stopper, and a line that is used to open the bottle and to lower and raise the sampler during sampling. The procedure for use is as follows:

- Assemble the weighted bottle sampler.
- Gently lower the sampler to the desired depth so as not to remove the stopper prematurely.
- Pull out the stopper with a sharp jerk of the sampler line.
- Allow the bottle to fill completely, as evidenced by the cessation of air bubbles.
- Raise the sampler and cap the bottle.
- Wipe the bottle clean. The sampling bottle can be also be used as the sample container for shipping.

Teflon bailers have also been used where feasible for collecting samples in deep bodies of water.

<b>SOP</b>	<b>1002.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Surface Water				
<b>TITLE</b>	Surface Water Sampling				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1002-01.DOC	<b>PAGE</b>	3 of 3

Another method of extending the reach of sampling efforts is the use of a small peristaltic pump. In this method the sample is drawn through heavy-wall Teflon tubing and pumped directly into the sample container. This system allows the operator to reach into the liquid body, sample from depth, or sweep the width of narrow streams.

The general sampling procedures are listed below:

1. Collect the sample using whichever technique, submerged bottle, bottle sampler with stopper, pump & tubing, or bailer.
2. The collected sample may be collected in the sample containers or may be transferred to the appropriate sample containers in order of the volatile organics first and inorganics last.
3. Label sample containers, place on ice in a cooler, remove, and decontaminate equipment as necessary.

## REFERENCES

SOP 0110.01 Sample Nomenclature  
SOP 1005.01 Field Duplicate Collection  
SOP 1005.02 Rinse Blank Preparation  
SOP 1005.03 Field Blank Preparation  
SOP 1101.01 Sample Custody - Field  
SOP 1102.01 Sample Shipping  
SOP 1201.01 Sampling Equipment Decontamination  
SOP 1501.01 Field Logbook

<b>SOP</b>	<b>1002.04</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Sediment Sampling				
<b>DATE</b>	2/23/2010	<b>FILE</b>	1002-04.DOC	<b>PAGE</b>	1 of 3

## INTRODUCTION

The following Standard Operating Procedure (SOP) is to describe the procedures for collecting representative sediment samples using a trowel, piston corer, WILDCO KB Core Sampler, a Ponar Grab Sampler, or other similar equipment. Analysis of sediment samples may be performed to determine whether concentrations of specific sediment pollutants exceed established action levels, or if the concentrations of sediment pollutants present a risk to public health, welfare, or the environment.

## PROCEDURE

### Overview

Sediment samples may be collected using trowels, core and Ponar sampler, or a variety of similar methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed versus undisturbed), and the type of sediment (fines versus coarse). Sampling in shallow areas or streams near the surface may only require a hand trowel, while sampling at depth may be performed using a core or Ponar sampler.

### Sample Preservation

Refrigeration to  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , supplemented by a minimal holding time, is suggested.

### Interferences and Potential Problems

There are two primary interferences or potential problems associated with sediment sampling: cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated (disposable) sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in mixing of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results. Homogenization may also affect sample representativeness when the analytical requirements include volatile organic compounds.

### Equipment or Apparatus

The equipment selected for the sampling effort may include the following as appropriate:

- Tape measure
- Survey stakes or flags
- Stainless steel, plastic, or other appropriate homogenization bucket or bowl
- Ziploc plastic bags
- Logbook
- Labels
- Chain-of-custody forms and seals
- Coolers
- Ice

<b>SOP</b>	<b>1002.04</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Sediment Sampling				
<b>DATE</b>	2/23/2010	<b>FILE</b>	1002-04.DOC	<b>PAGE</b>	2 of 3

- Decontamination supplies and equipment (i.e. brushes and buckets)
- Canvas or plastic sheeting
- Spatulas
- Scoops
- Plastic or stainless steel spoons
- Trowel
- Auger bucket
- Extension rods
- T-handle
- KB Core Sampler
- Ponar Grab Sampler
- Air monitor

#### Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are required.
2. Obtain necessary sampling and monitoring equipment from the list above. Additional equipment may be added to this list as appropriate to perform other sampling.
3. Decontaminate or preclean equipment, and ensure that it is in working order.
4. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.
5. Use stakes, buoys, or flagging to identify and mark all sampling locations. Consider specific site factors, including extent and nature of contaminant, when selecting sample locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and obstructions.

#### Sediment Sampling in Shallow Waters

The following procedures should be used when collecting sediment samples in shallow waters:

1. Collect sediments as specified in the work plan or as determined during office preparation activities, using a stainless steel trowel, piston corer or similar device and a stainless steel, tempered glass or aluminum container.
2. Standing downstream of the sample stations, collect discrete sediment samples from each station and, if required in the work plan, composite in stainless steel, tempered glass or aluminum container.
3. Collect sediment samples of deposited material from the depth specified in the work plan or as determined during the office preparation activities. Record the depth in the logbook. Selective removal of the top sediment layers may be required and should be accomplished by carefully removing the sediments with a stainless steel trowel or scoop. In streams where water velocity is insufficient to disturb sediment fines during sediment sampling, a stainless

<b>SOP</b>	<b>1002.04</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Soil Sampling Procedures				
<b>TITLE</b>	Sediment Sampling				
<b>DATE</b>	2/23/2010	<b>FILE</b>	1002-04.DOC	<b>PAGE</b>	3 of 3

steel trowel or scoop may be used for sampling. Where water velocities are high, a stainless steel corer will be utilized.

4. When applicable, composite discrete sediment samples by placing equal volumes of sediment material collected from the sample points into the container and mixing thoroughly to obtain a homogeneous mixture. Samples may be sieved or hand picked, if necessary, to remove larger materials, such as leaves, sticks, gravel, or rocks. Record in the logbook the nature of any materials removed from the sediment samples.
5. Place each sediment sample into the proper clean, unused sample container, as required by the work plan or laboratory. Sampling personnel must avoid placing sediment into the sample container and decanting off the excess liquid in analyzing for volatile organics and water soluble compounds in the sediment and reduces accurate representation of sediment analysis.
6. Fill out labels with waterproof ink and attach to the sample container.
7. Decontaminate sampling equipment between samples.

#### Sediment Sampling in Deep Waters

Procedures for sampling in deep waters are the same as for shallow waters except the sampling equipment is different. Soft, fine-grained sediments collected in deep waters will be sampled with a WILDCO KB Core Sampler or similar equipment. Coarse-grained sediments will be collected utilizing a Ponar Grab Sampler or similar equipment. Both samplers will be operated from a boat following appropriate safety procedures. Documentation, containerization, labeling and decontamination procedures are the same as for sediment samples collected in shallow waters.

#### Sediment Sampling in Drainage Ditches and Intermittent Streams

Procedures for sediment sampling in drainage ditches and the dry portions of intermittent streams are as specified for shallow water sediments.

<b>SOP</b>	<b>1005.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Field QA/QC Sampling				
<b>TITLE</b>	Field Duplicate Collection				
<b>DATE</b>	4/27/2005	<b>FILE</b>	1005-01.DOC	<b>PAGE</b>	1 of 2

## INTRODUCTION

The following Standard Operating Procedure (SOP) describes the procedure for collecting field duplicate soil and water samples. When samples are collected for analysis, it is typically desired that independent data allowing evaluation of laboratory precision (i.e., the degree to which a laboratory result can be repeated) on site-specific samples be collected.

A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. The sample containers are assigned an identification number in the field such that they cannot be identified (blind duplicate) as duplicated samples by laboratory personnel performing the analysis. Specific locations are designated for collection of field duplicate samples prior to the beginning of sample collection.

The duplicate soil sampling procedure is closely related to SOP Nos. 1001.01, 1001.03, and 1001.10 regarding soil sampling procedures. This procedure serves as an alternative method or extension of sample preparation prior to placing the samples in containers, as described in the 1001 series of the SOPs (e.g. 1001.01 and 1001.03).

## DUPLICATE SOIL SAMPLING PROCEDURE

The procedure to be used to physically collect soil samples are described in SOP Nos. 1001.01 and 1001.03. Reference should be made to these SOPs for specific sampling equipment, procedures, and other general guidelines. As soil is collected, the following procedure will be used to prepare a field duplicate sample:

- The soil will be collected in general accordance with SOP 1001.01 or 1001.03, with the exception that samples will generally not be immediately placed into sample containers and an additional preparation step (i.e., sample splitting) will be performed.
- As they are collected, soil samples to be submitted as field duplicates will be staged in a clean mixing bowl or mixing bucket.
- For samples that will be analyzed for volatile organic compounds, the soil sample will be split in half and an equal portion of soil will be placed directly into two or more different sample containers, each container representing a different sample for laboratory analysis. The soil will not be homogenized to minimize the potential for volatilization of the organic compounds potentially in the sample.
- For analyses of chemicals other than volatile organic compounds, the soil removed from the discrete sample location will be homogenized in a clean mixing bowl using a clean scoop or spatula (as described in SOPs 1001.01 and 1001.03). Homogenization will generally continue until the discrete samples being combined are reasonably indistinguishable as individual samples in the soil mixture. However, it is recognized that homogenization can be difficult for highly plastic clays. In this case, equal amounts of the soil core of each clay sample will be cut into small, roughly cubical pieces using a stainless steel knife and placed into a bowl and homogenized to extent practical.

<b>SOP</b>	<b>1005.01</b>				
<b>GROUP</b>	Sampling Procedures				
<b>SUB-GROUP</b>	Field QA/QC Sampling				
<b>TITLE</b>	Field Duplicate Collection				
<b>DATE</b>	4/27/2005	<b>FILE</b>	1005-01.DOC	<b>PAGE</b>	2 of 2

- The field duplicate sample (except for volatiles as note above) will be collected from the mixing bowl containing the homogenized samples after homogenization is performed. The composited sample will be collected using a stainless steel or disposable plastic scoop or similar tool. The sample will be placed in a clean sample container and then handled in accordance with soil sampling SOPs 1001.01 and 1001.03.

Another difference from the referenced SOPs is that additional soil volume may need to be collected from a discrete sample location during the sampling process to provide sufficient sample volume for two or more sets of laboratory analyses. If the collection of additional sample volume will result in the sample interval expanding to greater depths or laterally outward, the sampling tools identified in 1001 series of the SOPs can be used at two immediately vertically or laterally adjacent locations, as appropriate. If sampling from two adjacent but distinct locations is necessary to obtain adequate sample volume, the soil from the two locations should be composited in accordance with SOP 1001.10. Field duplicates of composited samples may also be performed using this SOP for field duplicate samples.

Variations on this procedure are allowable to accommodate different soil conditions and any site requirements specifically identified in the site-specific Sampling and Analysis Plan. Equipment that may be used as part of the soil compositing procedure is identified under SOP Nos. 1001.01 and 1001.03 where soil sampling methods are described.

## **DUPLICATE WATER SAMPLING PROCEDURES**

The procedure to be used to physically collect water samples are described in 1002 series of the SOPs (e.g. 1002.01 and 1002.02). Reference should be made to these SOPs for specific sampling equipment, procedures, and other general guidelines. A duplicate water sample will be collected from the same location as the parent sample and within 15 minutes of the collection of the parent sample.

The number of samples that may be submitted as blind field duplicates for the project in question will be specified in the site-specific sampling plan. Blind field duplicates are typically collected at a frequency of 1 per 10 samples of a given environmental media at sites, especially where laboratory analytical data will be used for evaluating regulatory compliance and other engineering judgments. Sampling in support of a routine monitoring program may not require field duplicates. Reference should be made to the site-specific contract and work plans.

## **REFERENCES**

SOP No. 1001.01 - Standard Operating Procedure, Surface Soil Sampling  
SOP No. 1001.03 - Standard Operating Procedure, Soil Sampling - Hand Auger Method  
SOP No. 1001.10 - Standard Operating Procedure, Soil Compositing

SOP	10 05.02				
GROUP	Sampling Procedures				
SUB-GROUP	Field QA/QC Sampling				
TITLE	Rinse Blank Preparation				
DATE	2/6/2009	FILE	1005-02.DOC	PAGE	1 of 1

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents a method to prepare a type of quality control sample specific to the field decontamination process, the equipment rinse blank. The rinse blank provides information on the effectiveness of the decontamination process employed in the field. When used in conjunction with field blanks and trip blanks, the rinse blank can be used to assist in evaluating possible compromise of samples from field related activities.

## PROCEDURE

The equipment rinse blank is prepared by passing target analyte-free (i.e., deionized) water over and through a field decontaminated sampling device, then collecting the rinse water in appropriate clean sample containers. Rinse blanks will typically be collected from equipment that comes in contact with samples, such as auger buckets, split spoons, bailers, shelby tubes, and stainless steel spoons/trowels. The collected sample will be coded appropriately prior to logging and shipping. Equipment blanks are not required if dedicated sampling equipment is used. Equipment blanks will be collected periodically during the day immediately after decontamination of the sampling equipment being used.

The frequency for collecting equipment blanks will be determined prior to engaging in field activities, and communicated in site-specific quality assurance project plans, sampling and analyses plans, or a type of work plan. Equipment blanks will be collected at a rate relative to each type of sample collection procedure (i.e., surface sample, sample at depth using a hand auger). Equipment blanks will generally be collected at a frequency of 1 per 20 (normal) samples of a given matrix.

<b>SOP</b>	<b>1101.01</b>				
<b>GROUP</b>	Sampling Handling				
<b>SUB-GROUP</b>	Sample Custody				
<b>TITLE</b>	Sample Custody in the Field				
<b>DATE</b>	<b>11/19/2001</b>	<b>FILE</b>	1101-01.DOC	<b>PAGE</b>	1 of 4

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents procedures for maintaining sample chain of custody (COC) during activities where samples are collected.

## PROCEDURE

Sample custody is defined as being under a person's custody if any of the following conditions exist:

- it is in their possession,
- it is in their view, after being in their possession,
- it was in their possession and they locked it up, or
- it is in a designated secure area.

A designated field sampler will be personally responsible for the care and custody of collected samples until they are transferred to another person or properly dispatched to the laboratory. To the extent practicable, as few people as possible will handle the samples.

Sample tags or labels will be completed and applied to the container of each sample. When the tags or labels are being completed, waterproof ink will be used. If waterproof ink is not used, the tags or labels will be covered by transparent waterproof tape. Sample containers may also be placed in Ziploc-type storage bags to help keep them clean in the cooler. Information typically included on the sample tags or labels will include the following:

- Project Code
- Station Number and Location
- Sample Identification Number
- Date and Time of Sample Collection
- Type of Laboratory Analysis Required
- Preservation Required, if applicable
- Collector's Signature
- Priority (optional)
- Other Remarks

Additional information may include:

- Anticipated Range of Results (Low, Medium, or High)
- Sample Analysis Priority

<b>SOP</b>	<b>1101.01</b>				
<b>GROUP</b>	Sampling Handling				
<b>SUB-GROUP</b>	Sample Custody				
<b>TITLE</b>	Sample Custody in the Field				
<b>DATE</b>	<b>11/19/2001</b>	<b>FILE</b>	1101-01.DOC	<b>PAGE</b>	2 of 4

A COC form will be completed each time a sample or group of samples is prepared for transfer to the laboratory. The form will repeat the information on each of the sample labels and will serve as documentation of handling during shipment. The minimum information requirements of the COC form are listed in Table 1101.01-A. An example COC form is shown in Figure 1101.01-A. The completed COC must be reviewed by the Field Team Leader or Site Manager prior to sample shipment. The COC form will remain each sample shipping container at all times, and another copy will be retained by the member of the sampling team who originally relinquished the samples or in a project file.

<b>SOP</b>	<b>1101.01</b>				
<b>GROUP</b>	Sampling Handling				
<b>SUB-GROUP</b>	Sample Custody				
<b>TITLE</b>	Sample Custody in the Field				
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**TABLE 1101.01-A CHAIN OF CUSTODY FORM**

<b>INFORMATION</b>	<b>COMPLETED BY</b>	<b>DESCRIPTION</b>
<b>COC</b>	Laboratory	enter a unique number for each chain of custody form
<b>SHIP TO</b>	Field Team	enter the laboratory name and address
<b>CARRIER</b>	Field Team	enter the name of the transporter (e.g., FedEx) or handcarried
<b>AIRBILL</b>	Field Team	enter the airbill number or transporter tracking number (if applicable)
<b>PROJECT NAME</b>	Field Team	enter the project name
<b>SAMPLER NAME</b>	Field Team	enter the name of the person collecting the samples
<b>SAMPLER SIGNATURE</b>	Field Team	signature of the person collecting the samples
<b>SEND RESULTS TO</b>	Field Team	enter the name and address of the prime contractor
<b>FIELD SAMPLE ID</b>	Field Team	enter the unique identifying number given to the field sample (includes MS, MSD, field duplicate and field blanks)
<b>DATE</b>	Field Team	enter the year and date the sample was collected in the format M/D (e.g., 6/3)
<b>TIME</b>	Field Team	enter the time the sample was collected in 24 hour format (e.g., 0900)
<b>MATRIX</b>	Field Team	enter the sample matrix (e.g., water, soil)
<b>PRESERVATIVE</b>	Field Team	enter the preservative used (e.g., HNO3) or "none"
<b>FILTERED/ UNFILTERED</b>	Field Team	enter "F" if the sample was filtered or "U" if the sample was not filtered
<b>CONTAINERS</b>	Field Team	enter the number of containers associated with the sample
<b>MS/MSD</b>	Field Team or Laboratory	enter "X" if the sample is designated for the MS/MSD
<b>ANALYSES REQUESTED</b>	Field Team	enter the method name of the analysis requested (e.g., SW6010A)
<b>COMMENTS</b>	Field Team	enter comments
<b>SAMPLE CONDITION UPON RECEIPT AT LABORATORY</b>	Laboratory	enter any problems with the condition of any sample(s)
<b>COOLER TEMPERATURE</b>	Laboratory	enter the internal temperature of the cooler, in degrees C, upon opening
<b>SPECIAL INSTRUCTIONS/COMMENTS</b>	Laboratory	enter any special instructions or comments
<b>RELEASED BY (SIG)</b>	Field Team and Laboratory	enter the signature of the person releasing custody of the samples
<b>COMPANY NAME</b>	Field Team and Laboratory	enter the company name employing the person releasing/receiving custody
<b>RECEIVED BY (SIG)</b>	Field Team and Laboratory	enter the signature of the person receiving custody of the samples
<b>DATE</b>	Field Team and Laboratory	enter the date in the format M/D/YY (e.g., 6/3/96) when the samples were released/received
<b>TIME</b>	Field Team and Laboratory	enter the date in 24 hour format (e.g., 0900) when the samples were released/received

<b>SOP</b>	<b>1101.01</b>				
<b>GROUP</b>	Sampling Handling				
<b>SUB-GROUP</b>	Sample Custody				
<b>TITLE</b>	Sample Custody in the Field				
<b>DATE</b>	<b>11/19/2001</b>	<b>FILE</b>	1101-01.DOC	<b>PAGE</b>	4 of 4

**FIGURE 1101.01-A CHAIN OF CUSTODY FORM**

<b>SOP</b>	<b>1102.01</b>				
<b>GROUP</b>	Sample Handling				
<b>SUB-GROUP</b>	Sample Shipping				
<b>TITLE</b>	Sample Shipping				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1102-01.DOC	<b>PAGE</b>	1 of 1

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents the procedures for sample shipping that will be implemented during field work involving sampling activities.

## TERMS

COC - Chain-of-Custody

## PROCEDURE

Prior to shipping or transferring custody of samples, they will be packed according to D.O.T. requirements with sufficient ice to maintain an internal temperature of  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$  during transport to the laboratory. Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

1. Samples will be accompanied by a COC record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. If sent by common carrier, a bill of lading or airbill should be used. Bill of lading and airbill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory. The designated laboratory will accept custody in the field upon sample pick-up or at the laboratory if the samples are delivered via field personnel or a courier service.
2. Samples will be properly packed in approved shipping containers for laboratory pick-up by the appropriate laboratory for analysis, with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be padlocked or custody-sealed for transfer to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to itself so that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape. The seal will then be signed. The designated laboratory will accept custody of the samples upon receipt.
3. Whenever samples are split with state representatives or other parties, the COC record will be marked to indicate with whom the samples were split.
4. The field sampler will call the designated laboratory to inform them of sample shipment and verify sample receipt as necessary.

<b>SOP</b>	<b>1201.01</b>				
<b>GROUP</b>	Decontamination				
<b>SUB-GROUP</b>	Sampling Equipment Decontamination				
<b>TITLE</b>	Sampling Equipment Decontamination				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1201-01.DOC	<b>PAGE</b>	1 of 3

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents the methods used for minimizing the potential for cross-contamination, and provides general guidelines for sampling equipment decontamination procedures.

## PROCEDURE

As part of the Health and Safety Plan (HASP), develop and set up a decontamination plan before any personnel or equipment enter the areas of potential exposure. The decontamination plan should include the following:

- The number, location, and layout of decontamination stations
- Which decontamination apparatus is needed
- The appropriate decontamination methods
- Methods for disposal of contaminated clothing, apparatus, and solutions

### Decontamination Methods

Personnel, samples, and equipment leaving the contaminated area of a site will be decontaminated. Various decontamination methods will be used to either physically remove contaminants, inactivate contaminants by disinfection or sterilization, or both. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and non-abrasive methods.

#### *Abrasive Cleaning Methods*

Abrasive cleaning methods work by rubbing/scrubbing the surface containing the contaminant. This method includes mechanical and wet blasting methods.

Mechanical cleaning methods use brushes of metal or nylon. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.

Cleaning can also be accomplished by water blasting which is also referred to as steam cleaning and pressure washing. Pressure washing utilizes high-pressure that is sprayed from a nozzle onto sampling equipment to physically remove soil or (potentially) contaminated material. Steam cleaning is a modification of pressure washing where the water is heated to temperatures approaching 100°C to assist in removing organic constituents from equipment.

<b>SOP</b>	<b>1201.01</b>				
<b>GROUP</b>	Decontamination				
<b>SUB-GROUP</b>	Sampling Equipment Decontamination				
<b>TITLE</b>	Sampling Equipment Decontamination				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1201-01.DOC	<b>PAGE</b>	2 of 3

### *Disinfection/Rinse Methods*

Disinfectants are a practical means of inactivating chemicals or contaminants of concern. Standard sterilization methods involve heating the equipment which is impractical for large equipment. Rinsing removes contaminants through dilution, physical attraction, and solubilization.

The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be target analyte free. Tap water may be used from any municipal water treatment system for mixing of decontamination solutions. An untreated potable water supply is not an acceptable substitute for tap water. Acids and solvents are occasionally utilized in decontamination of equipment to remove metals and organics, respectively, from sampling equipment. Other than ethanol, these are avoided when possible due to the safety, disposal, and transportation concerns associated with them.

Equipment or apparatuses that may be selected for use include the following:

- Personal protective clothing
- Non-phosphate detergent
- Selected solvents for removal of polar and nonpolar organics (ethanol, methanol, hexane)
- Acid washes for removal of metals (nitric acid)
- Long-handled brushes
- Drop cloths or plastic sheeting
- Paper towels
- Galvanized tubs or buckets
- Distilled, deionized, or tap water (as required by the project)
- Storage containers for spent wash solutions
- Sprayers (pressurized and non-pressurized)
- Trash bags
- Safety glasses or splash shield

### Field Sampling Equipment Cleaning Procedures

The following procedures should be followed:

1. Where applicable, follow physical removal procedures previously described (pressure wash, scrub wash)
2. Wash equipment with a non-phosphate detergent solution
3. Rinse with tap water
4. Rinse with distilled or deionized water
5. Rinse with 10% nitric acid if the sample will be analyzed for metals/organics
6. Rinse with distilled or deionized water
7. Use a solvent rinse (pesticide grade) if the sample will be analyzed for organics
8. Air dry the equipment completely
9. Rinse again with distilled or deionized water

<b>SOP</b>	<b>1201.01</b>				
<b>GROUP</b>	Decontamination				
<b>SUB-GROUP</b>	Sampling Equipment Decontamination				
<b>TITLE</b>	Sampling Equipment Decontamination				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1201-01.DOC	<b>PAGE</b>	3 of 3

10. Place in clean bag or container for storage/transport to subsequent sampling locations.

Selection of the solvent for use in the decontamination process is based on the contaminants present at the site. Solvent rinses are not necessarily required when organics are not a contaminant of concern and may be eliminated from the sequence specified below. Similarly, an acid rinse is not required if the analyses do not include inorganics. Use of a solvent is required when organic contamination is present on-site. Typical solvents used for removal of organic contaminants include acetone, ethanol, hexane, methanol, or water. An acid rinse step is required if metals are present on-site. If a particular contaminant fraction is not present at the site, the ten-step decontamination procedure listed above may be modified for site specificity.

Sampling equipment that requires the use of plastic tubing should be disassembled and the tubing replaced with clean tubing before commencement of sampling and between sampling locations. Plastic tubing should not be reused.

<b>SOP</b>	<b>1501.01</b>				
<b>GROUP</b>	Field Documentation				
<b>SUB-GROUP</b>					
<b>TITLE</b>	Field Logbook				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1501-01.DOC	<b>PAGE</b>	1 of 3

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents the procedures for documenting activities observed or completed in the field in a field logbook. The documentation should represent all activities of WESTON personnel and entities under WESTON's supervision.

## TERMS

FSP - Field Sampling Plan

SAP - Sampling and Analysis Plan

QAPP - Quality Assurance Project Plan

HASP - Health and Safety Plan

## PROCEDURE

Field logbooks will be used and maintained during field activities to document pertinent information observed or completed by WESTON personnel or entities that WESTON is responsible for providing oversight. Field logbooks are legal documents that form the basis for later written reports and may serve as evidence in legal proceedings. The Site Manager or Field Team Leader will review field log entries daily and initial each page of entries. Field logbooks will be maintained by the Site Manager or Field Team Leader during field activities and transferred to the project files for a record of activities at the conclusion of the project. General logbook entry procedures are listed below.

- Logbooks must be permanently bound with all pages numbered to the end of the book. Entries should begin on page 1.
- Only use blue or black ink (waterproof) for logbook entries.
- Sign entries at the end of the day, or before someone else writes in the logbook.
- If a complete page is not used, draw a line diagonally across the blank portion of the page and initial and date the bottom line.
- If a line on the page is not completely filled, draw a horizontal line through the blank portion.
- Ensure that the logbook clearly shows the sequence of the day's events.
- Do not write in the margins or between written lines, and do not leave blank pages to fill in later.
- If an error is made, make corrections by drawing a single line through the error and initialing it.
- Maintain control of the logbook and keep in a secure location.

<b>SOP</b>	<b>1501.01</b>				
<b>GROUP</b>	Field Documentation				
<b>SUB-GROUP</b>					
<b>TITLE</b>	Field Logbook				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1501-01.DOC	<b>PAGE</b>	2 of 3

Field logbooks will contain, at a minimum, the following information, if applicable:

#### General Information

- Name, location of site, and work order number
- Name of the Site Manager or Field Team Leader
- Names and responsibilities of all field team members using the logbook (or involved with activities for which entries are being made)
- Weather conditions
- Field observations
- Names of any site visitors including entities that they represent

#### Sample Collection Activities

- Date(s) and times of the sample collection or event.
- Number and types of collected samples.
- Sample location with an emphasis on any changes to documentation in governing documents (i.e., SAP, FSP). This may include measurements from reference points or sketches of sample locations with respect to local features.
- Sample identification numbers, including any applicable cross-references to split samples or samples collected by another entity.
- A description of sampling methodology, or reference to any governing document (i.e., FSP, SAP, QAPP).
- Summary of equipment preparation and decontamination procedures.
- Sample description including depth, color, texture, moisture content, and evidence of waste material or staining.
- Air monitoring (field screening) results.
- Types of laboratory analyses requested.

#### Site Health and Safety Activities

- All safety, accident, and/or incident reports.

<b>SOP</b>	<b>1501.01</b>				
<b>GROUP</b>	Field Documentation				
<b>SUB-GROUP</b>					
<b>TITLE</b>	Field Logbook				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1501-01.DOC	<b>PAGE</b>	3 of 3

- Real-time personnel air monitoring results, if applicable, or if not documented in the HASP.
- Heat/cold stress monitoring data, if applicable.
- Reasons for upgrades or downgrades in personal protective equipment.
- Health and safety inspections, checklists (drilling safety guide), meetings/briefings.
- Calibration records for field instruments.

#### Oversight Activities

- Progress and activities performed by contractors including operating times.
- Deviations of contractor activities with respect to project governing documents (i.e., specifications).
- Contractor sampling results and disposition of contingent soil materials/stockpiles.
- Excavation specifications and locations of contractor confirmation samples.
- General site housekeeping and safety issues by site contractors.

<b>SOP</b>	<b>1502.01</b>				
<b>GROUP</b>	Field Documentation				
<b>SUB-GROUP</b>					
<b>TITLE</b>	Photograph Logs				
<b>DATE</b>	11/19/2001	<b>FILE</b>	1502-01.DOC	<b>PAGE</b>	1 of 1

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents the requirements for collecting information related to photodocumentation of site activities.

## PROCEDURE

- Uniquely number each roll of film obtained for use.
- Record the following information for each negative exposed:
  1. Date and Time
  2. Photographer Name
  3. Witness Name
  4. Orientation (Landscape, Portrait, or Panaoramic)
  5. Description (including activity being performed, specific equipment of interest, sample location(s), compass direction photographer is facing)
- Record "NA" for the negatives not used if the roll is not completely used prior to development.
- Record unique roll number on receipt when film is submitted for development.
- Verify descriptions on log with negative numbers when photographs are received from processing.

## FORMS

Blank Photograph Logs can be printed from WESTON On-Line from the *Records Management Application*. Selecting the *Reports/Project Planning/Blank Photo Logs* menu option will generate a project specific log with 36 entries.

<b>SOP 0110 .05</b>					
<b>GROUP</b>	Database Management System				
<b>SUB-GROUP</b>	Data Collection and Acquisition				
<b>TITLE</b>	Sample Nomenclature				
<b>DATE</b>	04/01/2010	<b>FILE</b>	0110.05.docx	<b>PAGE</b>	1 of 2

## INTRODUCTION

The following Standard Operating Procedure (SOP) presents the sample nomenclature for analytical samples that will generate unique sample names compatible with most data management systems. The sample nomenclature is based upon specific requirements for the reporting of these results. A site specific data management plan should be prepared prior to sample collection.

## PROCEDURE

### SAMPLE NOMENCLATURE – SOIL AND SEDIMENT

**Area of Concern – ID – Depth - Collection Type + QC Type + Rationale**

#### Where:

**Area of Concern:** A four-digit identifier used to designate the particular Area of Concern (AOC) that the location where the sample was collected.

**ID:** A three letter &/or digit identifier used to designate the particular location (i.e. grid A01, P06, or 055) in the AOC from which the sample was collected or the center of the composite sample.

**Depth:** A two-digit code used to designate what depth of sample was collected:

code	Assessment	Confirmation
00	0 to 0 Surface	N/A
03	0 to 3 inches	3 inches below original ground surface
06	3 to 6 inches	6 inches below original ground surface
12	6 to 12 inches	12 inches below original ground surface

**Collection Type:** A one-digit code used to designate what type of sample was collected:

1	Surface Water	6	Sediment
2	Ground Water	7	
3	Field QC/water sample	8	
4	Waste	9	
5	Soil		

**QC Type:** A one-digit code used to designate the QC type of the sample:

1	Normal
2	Duplicate
3	Rinsate Blank
4	Trip Blank
5	Field Blank
6	Confirmation, Normal
7	Confirmation, Duplicate

<b>SOP 0110 .05</b>					
<b>GROUP</b>	Database Management System				
<b>SUB-GROUP</b>	Data Collection and Acquisition				
<b>TITLE</b>	Sample Nomenclature				
<b>DATE</b>	04/01/2010	<b>FILE</b>	0110.05.docx	<b>PAGE</b>	2 of 2

**Rationale:** A one-digit code used to designate the rationale for sample collection:

1	Background
2	Observed Release
3	Source Characterization
4	Overland Flow
5	Extent of contamination
6	
7	
8	

**Examples:**

- **HNC-01-00-111:** Represents the normal surface water sample collected from the Houma Navigation Canal (HNC) at location 1, from the surface, to establish background  
.
- **CC-02-00-112:** : Represents the normal surface water sample collected from the Company Canal (CC) at location 2, from the surface, to establish observed release  
.
- **EAST-C01-48-515:** Represents the normal soil sample collected from the East parcel in Grid C01 with max depth of 48 inches (2 to 4 ft sample), to establish extent of contamination.
- **EAST-C01-00-33:** Represents the rinsate sample from the East parcel in Grid C01, depth not applicable, and no rationale required.

NOTE: The depth is in relation to the original ground surface.



## SURFACE WATER SAMPLING

SOP#: 2013  
DATE: 11/17/94  
REV. #: 0.0

### 1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) is applicable to the collection of representative liquid samples, both aqueous and non-aqueous from streams, rivers, lakes, ponds, lagoons, and surface impoundments. It includes samples collected from depth, as well as samples collected from the surface.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure or other procedure limitations. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (EPA) endorsement or recommendation for use.

### 2.0 METHOD SUMMARY

Sampling situations vary widely, therefore, no universal sampling procedure can be recommended. However, sampling of both aqueous and non-aqueous liquids from the above mentioned sources is generally accomplished through the use of one of the following samplers or techniques:

- C Kemmerer bottle
- C Bacon bomb sampler
- C Dip sampler
- C Direct method

These sampling techniques will allow for the collection of representative samples from the majority of surface waters and impoundments encountered.

### 3.0 SAMPLE PRESERVATION , CONTAINERS, HANDLING , AND STORAGE

Once samples have been collected, the following procedure should be followed:

1. Transfer the sample(s) into suitable, labeled sample containers.
2. Preserve the sample if appropriate, or use pre-preserved sample bottles. Do not overfill bottles if they are pre-preserved.
3. Cap the container, place in a ziploc plastic bag and cool to 4°C.
4. Record all pertinent data in the site logbook and on field data sheets.
5. Complete the Chain of Custody record.
6. Attach custody seals to cooler prior to shipment.
7. Decontaminate all sampling equipment prior to the collection of additional samples with that sampling device.

### 4.0 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary interferences or potential problems with surface water sampling. These include cross contamination of samples and improper sample collection.

1. Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Refer to the Sampling Equipment Decontamination SOP.
2. Improper sample collection can involve using contaminated equipment, disturbance of the stream or impoundment substrate, and sampling in an obviously disturbed area.

Following proper decontamination procedures and minimizing disturbance of the sample site will eliminate these problems.

## 5.0 EQUIPMENT/APPARATUS

Equipment needed for collection of surface water samples may include (depending on technique chosen):

- C Kemmerer bottles
- C Bacon bomb sampler
- C Dip sampler
- C Line and messengers
- C Sample bottles/preservatives
- C Ziploc bags
- C Ice
- C Coolers
- C Chain of Custody records, custody seals
- C Field data sheets
- C Decontamination equipment
- C Maps/plot plan
- C Safety equipment
- C Compass
- C Tape measure
- C Survey stakes, flags, or buoys and anchors
- C Camera and film
- C Logbook/waterproof pen
- C Sample bottle labels

## 6.0 REAGENTS

Reagents will be utilized for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed.

## 7.0 PROCEDURES

### 7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies needed.
2. Obtain the necessary sampling and monitoring equipment.
3. Decontaminate or pre-clean equipment, and ensure that it is in working order.
4. Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate.
5. Perform a general site survey prior to site entry, in accordance with the site specific Health and Safety Plan.
6. Use stakes, flagging, or buoys to identify and mark all sampling locations. If required the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. If collecting sediment samples, this procedure may disturb the bottom.

### 7.2 Representative Sampling Considerations

In order to collect a representative sample, the hydrology and morphometrics of a stream or impoundment should be determined prior to sampling. This will aid in determining the presence of phases or layers in lagoons, or impoundments, flow patterns in streams, and appropriate sample locations and depths.

Water quality data should be collected in impoundments, and to determine if stratification is present. Measurements of dissolved oxygen, pH, and temperature can indicate if strata exist which would effect analytical results. Measurements should be collected at one-meter intervals from the substrate to the surface using the appropriate instrument (i.e., a Hydrolab or equivalent).

Water quality measurements such as dissolved oxygen, pH, temperature, conductivity, and oxidation-reduction potential can assist in the interpretation of analytical data and the selection of sampling sites and depths when surface water samples are collected.

Generally, the deciding factors in the selection of a sampling device for sampling liquids in streams, rivers, lakes, ponds, lagoons, and surface impoundments are:

1. Will the sample be collected from shore or from a boat?
2. What is the desired depth at which you wish to collect the sample?
3. What is the overall depth and flow direction of river or stream?
4. What type of sample will be collected (i.e., water or lagoon liquids)?

### 7.2.1 Sampler Composition

The appropriate sampling device must be of a proper composition. Selection of samplers constructed of glass, stainless steel, PVC or PFTE (Teflon) should be based upon the analyses to be performed.

## 7.3 Sample Collection

### 7.3.1 Kemmerer Bottle

A Kemmerer bottle (Figure 1, Appendix A) may be used in most situations where site access is from a boat or structure such as a bridge or pier, and where samples at depth are required. Sampling procedures are as follows:

1. Use a properly decontaminated Kemmerer bottle. Set the sampling device so that the sampling end pieces (upper and lower stoppers) are pulled away from the sampling tube (body), allowing the substance to be sampled to pass through this tube.
2. Lower the pre-set sampling device to the predetermined depth. Avoid bottom disturbance.

3. When the Kemmerer bottle is at the required depth, send down the messenger, closing the sampling device.
4. Retrieve the sampler and discharge from the bottom drain the first 10-20 mL to clear any potential contamination of the valve. Transfer the sample to the appropriate sample container.

### 7.3.2 Bacon Bomb Sampler

A bacon bomb sampler (Figure 2, Appendix A) may be used in situations similar to those outlined for the Kemmerer bottle. Sampling procedures are as follows:

1. Lower the bacon bomb sampler carefully to the desired depth, allowing the line for the trigger to remain slack at all times. When the desired depth is reached, pull the trigger line until taut. This will allow the sampler to fill.
2. Release the trigger line and retrieve the sampler.
3. Transfer the sample to the appropriate sample container by pulling up on the trigger.

### 7.3.3 Dip Sampler

A dip sampler (Figure 3, Appendix A) is useful in situations where a sample is to be recovered from an outfall pipe or along a lagoon bank where direct access is limited. The long handle on such a device allows access from a discrete location. Sampling procedures are as follows:

1. Assemble the device in accordance with the manufacturer's instructions.
2. Extend the device to the sample location and collect the sample by dipping the sampler into the substance.
3. Retrieve the sampler and transfer the sample to the appropriate sample container.

#### 7.3.4 Direct Method

For streams, rivers, lakes, and other surface waters, the direct method may be utilized to collect water samples from the surface directly into the sample bottle. This method is not to be used for sampling lagoons or other impoundments where contact with contaminants is a concern.

Using adequate protective clothing, access the sampling station by appropriate means. For shallow stream stations, collect the sample under the water surface while pointing the sample container upstream; the container must be upstream of the collector. Avoid disturbing the substrate. For lakes and other impoundments, collect the sample under the water surface avoiding surface debris and the boat wake.

When using the direct method, do not use pre-preserved sample bottles as the collection method may dilute the concentration of preservative necessary for proper sample preservation.

### 8.0 CALCULATIONS

This section is not applicable to this SOP.

### 9.0 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance (QA) activities which apply to the implementation of these procedures. However, the following general QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation and they must be documented.

### 10.0 DATA VALIDATION

This section is not applicable to this SOP.

### 11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and corporate health and safety procedures.

More specifically, when sampling lagoons or surface impoundments containing known or suspected hazardous substances, adequate precautions must be taken to ensure the safety of sampling personnel. The sampling team member collecting the sample should not get too close to the edge of the impoundment, where bank failure may cause him/her to lose his/her balance. The person performing the sampling should be on a lifeline and be wearing adequate protective equipment. When conducting sampling from a boat in an impoundment or flowing waters, appropriate boating safety procedures should be followed.

### 12.0 REFERENCES

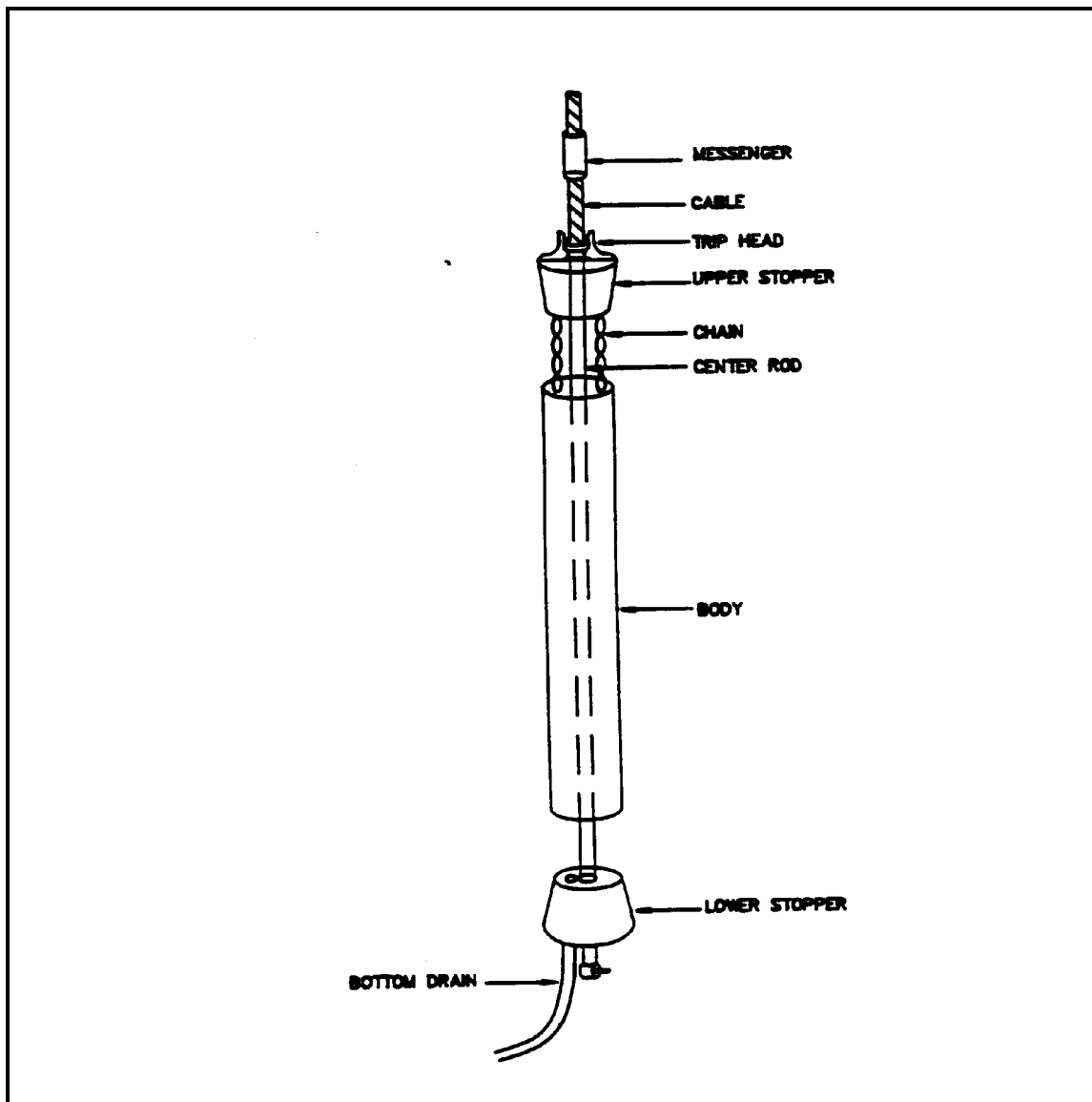
U.S. Geological Survey. 1977. National Handbook or Recommended Methods for Water Data Acquisition. Office of Water Data Coordination Reston, Virginia. (Chapter Updates available).

U.S. Environmental Protection Agency. 1984. Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition. EPA/600/4-84-076.

## APPENDIX A

### Figures

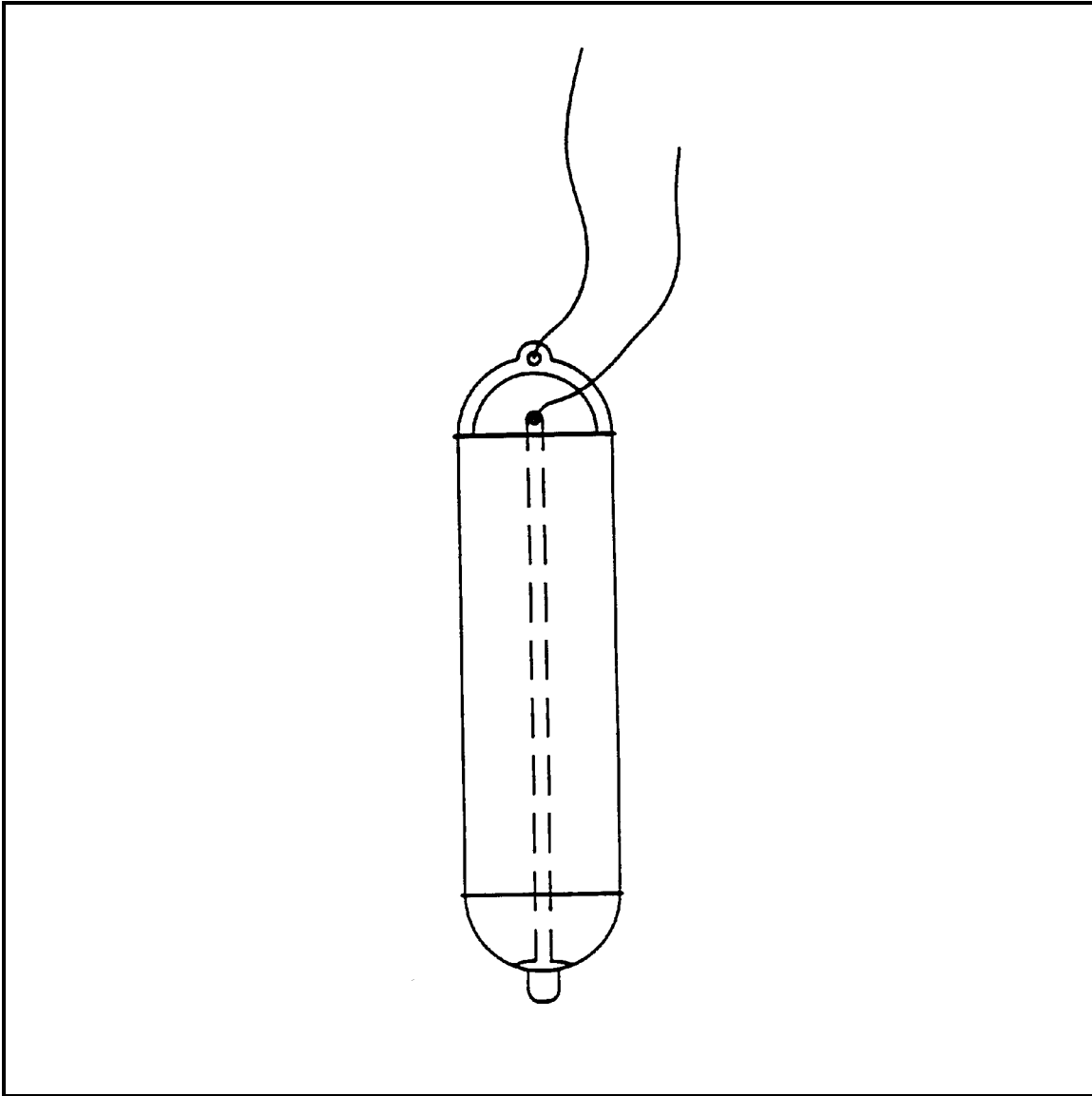
FIGURE 1. Kemmerer Bottle



## APPENDIX A (Cont'd)

### Figures

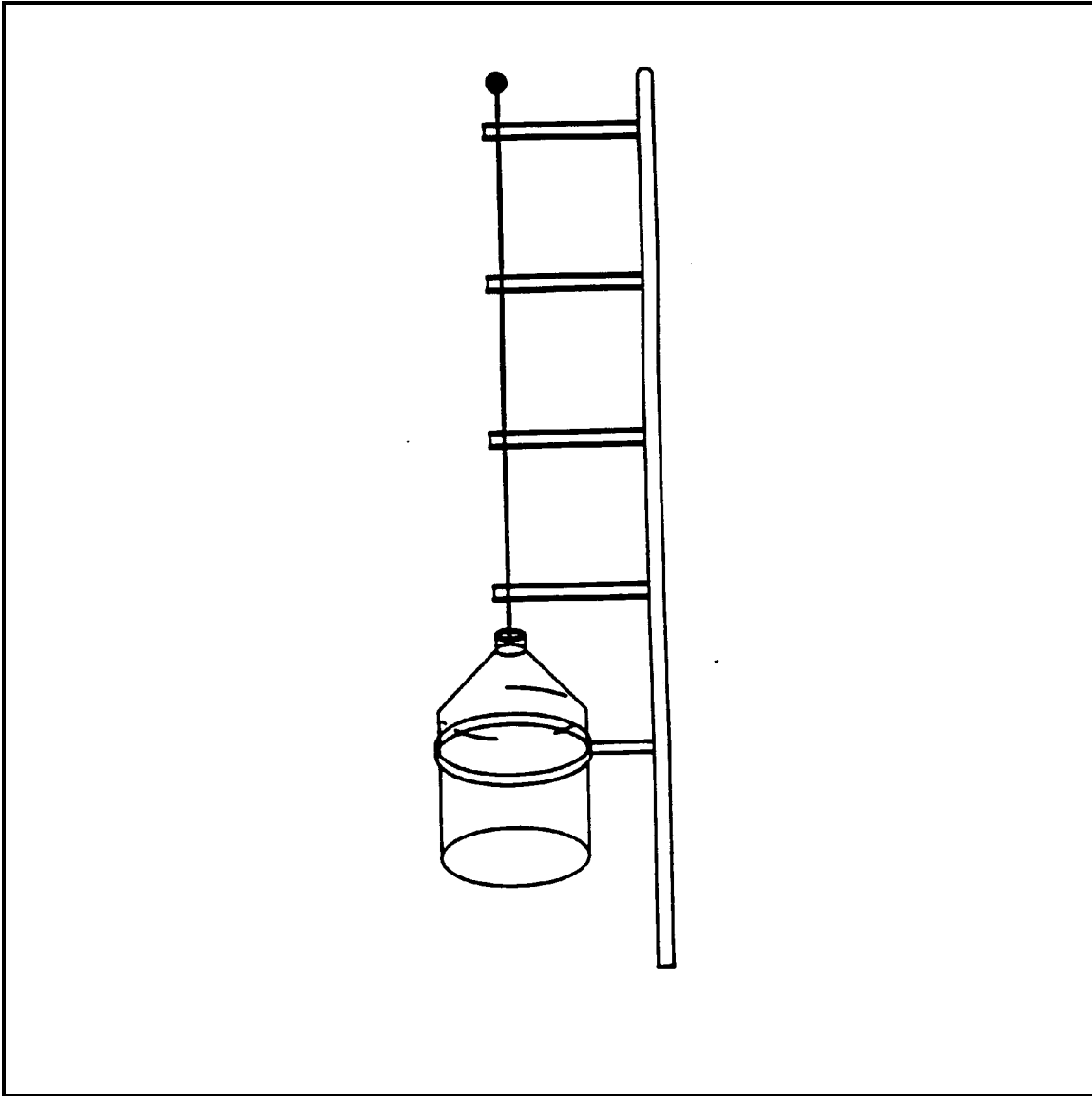
FIGURE 2. Bacon Bomb Sampler



## APPENDIX A (Cont'd)

### Figures

FIGURE 3. Dip Sampler





## SEDIMENT SAMPLING

SOP#: 2016  
DATE: 11/17/94  
REV. #: 0.0

### 1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) is applicable to the collection of representative sediment samples. Analysis of sediment may be biological, chemical, or physical in nature and may be used to determine the following:

- C toxicity;
- C biological availability and effects of contaminants;
- C benthic biota;
- C extent and magnitude of contamination;
- C contaminant migration pathways and source;
- C fate of contaminants;
- C grain size distribution.

The methodologies discussed in this SOP are applicable to the sampling of sediment in both flowing and standing water. They are generic in nature and may be modified in whole or part to meet the handling and analytical requirements of the contaminants of concern, as well as the constraints presented by site conditions and equipment limitations. However, if modifications occur, they should be documented in a site or personal logbook and discussed in reports summarizing field activities and analytical results.

For the purposes of this procedure, sediments are those mineral and organic materials situated beneath an aqueous layer. The aqueous layer may be either static, as in lakes, ponds, and impoundments; or flowing, as in rivers and streams.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

### 2.0 METHOD SUMMARY

Sediment samples may be collected using a variety of methods and equipment, depending on the depth of the aqueous layer, the portion of the sediment profile

required (surface vs. subsurface), the type of sample required (disturbed vs. undisturbed), contaminants present, and sediment type.

Sediment is collected from beneath an aqueous layer either directly, using a hand held device such as a shovel, trowel, or auger; or indirectly, using a remotely activated device such as an Ekman or Ponar dredge. Following collection, sediment is transferred from the sampling device to a sample container of appropriate size and construction for the analyses requested. If composite sampling techniques are employed, multiple grabs are placed into a container constructed of inert material, homogenized, and transferred to sample containers appropriate for the analyses requested. The homogenization procedure should not be used if sample analysis includes volatile organics; in this case, sediment, or multiple grabs of sediment, should be transferred directly from the sample collection device or homogenization container to the sample container.

### 3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING AND STORAGE

1. Chemical preservation of solids is generally not recommended. Cooling to 4°C is usually the best approach, supplemented by the appropriate holding time for the analyses requested.
2. Wide mouth glass containers with Teflon lined caps are utilized for sediment samples. The sample volume is a function of the analytical requirements and will be specified in the Work Plan.
3. If analysis of sediment from a discrete depth or location is desired, sediment is transferred directly from the sampling device to a labeled sample container(s) of appropriate size and construction for the analyses

requested. Transfer is accomplished with a stainless steel or plastic lab spoon or equivalent.

4. If composite sampling techniques or multiple grabs are employed, equal portions of sediment from each location are deposited into a stainless steel, plastic, or other appropriate composition (e.g., Teflon) containers. The sediment is homogenized thoroughly to obtain a composite representative of the area sampled. The composite sediment sample is transferred to a labeled container(s) of appropriate size and construction for the analyses requested. Transfer of sediment is accomplished with a stainless steel or plastic lab spoon or equivalent. Samples for volatile organic analysis must be transferred directly from the sample collection device or pooled from multiple areas in the homogenization container prior to mixing. This is done to minimize loss of contaminant due to volatilization during homogenization.
5. All sampling devices should be decontaminated, then wrapped in aluminum foil. The sampling device should remain in this wrapping until it is needed. Each sampling device should be used for only one sample. Disposable sampling devices for sediment are generally impractical due to cost and the large number of sediment samples which may be required. Sampling devices should be cleaned in the field using the decontamination procedure described in the Sampling Equipment Decontamination SOP.

#### **4.0 INTERFERENCES AND POTENTIAL PROBLEMS**

Substrate particle size and organic matter content are a direct consequence of the flow characteristics of a waterbody. Contaminants are more likely to be concentrated in sediments typified by fine particle size and a high organic matter content. This type of sediment is most likely to be collected from depositional zones. In contrast, coarse sediments with low organic matter content do not typically concentrate pollutants and are generally found in erosional zones. The selection of a sampling location

can, therefore, greatly influence the analytical results and should be justified and specified in the Work Plan.

#### **5.0 EQUIPMENT/APPARATUS**

Equipment needed for collection of sediment samples may include:

- C Maps/plot plan
- C Safety equipment
- C Compass
- C Tape measure
- C Survey stakes, flags, or buoys and anchors
- C Camera and film
- C Stainless steel, plastic, or other appropriate composition bucket
- C 4-oz., 8-oz., and one-quart wide mouth jars w/Teflon lined lids
- C Ziploc plastic bags
- C Logbook
- C Sample jar labels
- C Chain of Custody records, field data sheets
- C Cooler(s)
- C Ice
- C Decontamination supplies/equipment
- C Spade or shovel
- C Spatula
- C Scoop
- C Trowel
- C Bucket auger
- C Tube auger
- C Extension rods
- C "T" handle
- C Sediment coring device (tube, drive head, eggshell check valve, nosecone, acetate tube, extension rods, "T" handle)
- C Ponar dredge
- C Ekman dredge
- C Nylon rope or steel cable
- C Messenger device

#### **6.0 REAGENTS**

Reagents are not used for preservation of sediment samples. Decontamination solutions are specified in the Sampling Equipment Decontamination SOP.

## **7.0 PROCEDURES**

### **7.1 Preparation**

1. Determine the objective(s) and extent of the sampling effort. The sampling methods to be employed, and the types and amounts of equipment and supplies required will be a function of site characteristics and objectives of the study.
2. Obtain the necessary sampling and monitoring equipment.
3. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.
4. Decontaminate or preclean equipment, and ensure that it is in working order.
5. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.
6. Use stakes, flagging, or buoys to identify and mark all sampling locations. Specific site factors including flow regime, basin morphometry, sediment characteristics, depth of overlying aqueous layer, contaminant source, and extent and nature of contamination should be considered when selecting sample locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions.

### **7.2 Sample Collection**

Selection of a sampling device is most often contingent upon: (1) the depth of water at the sampling location, and (2) the physical characteristics of the sediment to be sampled. The following procedures may be utilized:

#### **7.2.1 Sampling Surface Sediment with a Trowel or Scoop from Beneath a Shallow Aqueous Layer**

For the purpose of this method, surface sediment is considered to range from 0 to six inches in depth and

a shallow aqueous layer is considered to range from 0 to 12 inches in depth. Collection of surface sediment from beneath a shallow aqueous layer can be accomplished with tools such as spades, shovels, trowels, and scoops. Although this method can be used to collect both unconsolidated/consolidated sediment, it is limited somewhat by the depth and movement of the aqueous layer. Deep and rapidly flowing water render this method less accurate than others discussed below. However, representative samples can be collected with this procedure in shallow sluggish water provided care is demonstrated by the sample team member. A stainless steel or plastic sampling implement will suffice in most applications. Care should be exercised to avoid the use of devices plated with chrome or other materials; plating is particularly common with garden trowels.

The following procedure will be used to collect sediment with a scoop, shovel, or trowel:

1. Using a decontaminated sampling implement, remove the desired thickness and volume of sediment from the sampling area.
2. Transfer the sample into an appropriate sample or homogenization container. Ensure that non-dedicated containers have been adequately decontaminated.
3. Surface water should be decanted from the sample or homogenization container prior to sealing or transfer; care should be taken to retain the fine sediment fraction during this procedure.

#### **7.2.2 Sampling Surface Sediment with a Bucket Auger or Tube Auger from Beneath a Shallow Aqueous Layer**

For the purpose of this method, surface sediment is considered to range from 0 to six inches in depth and a shallow aqueous layer is considered to range from 0 to 24 inches in depth. Collection of surface sediment from beneath a shallow aqueous layer can be accomplished with a system consisting of bucket auger or tube auger, a series of extensions, and a "T" handle (Figure 1, Appendix A). The use of additional extensions in conjunction with a bucket auger can increase the depth of water from which sediment can be collected from 24 inches to 10 feet or more. However, sample handling and manipulation increases

in difficulty with increasing depth of water. The bucket auger or tube auger is driven into the sediment and used to extract a core. The various depths represented by the core are homogenized or a subsample of the core is taken from the appropriate depth.

The following procedure will be used to collect sediment samples with a bucket auger or tube auger:

1. An acetate core may be inserted into the bucket auger or tube auger prior to sampling if characteristics of the sediments or waterbody warrant. By using this technique, an intact core can be extracted.
2. Attach the auger head to the required length of extensions, then attach the "T" handle to the upper extension.
3. Clear the area to be sampled of any surface debris.
4. Insert the bucket auger or tube auger into the sediment at a 0° to 20° angle from vertical. This orientation minimizes spillage of the sample from the sampler upon extraction from the sediment and water.
5. Rotate the auger to cut a core of sediment.
6. Slowly withdraw the auger; if using a tube auger, make sure that the slot is facing upward.
7. Transfer the sample or a specified aliquot of sample into an appropriate sample or homogenization container. Ensure that non-dedicated containers have been adequately decontaminated.

### 7.2.3 Sampling Deep Sediment with a Bucket Auger or Tube Auger from Beneath a Shallow Aqueous Layer

For the purpose of this method, deep sediment is considered to range from six to greater than 18 inches in depth and a shallow aqueous layer is considered to range from 0 to 24 inches. Collection of deep sediment from beneath a shallow aqueous layer can be accomplished with a system consisting of a bucket auger, a tube auger, a series of extensions and a

"T" handle. The use of additional extensions can increase the depth of water from which sediment can be collected from 24 inches to five feet or more. However, water clarity must be high enough to permit the sampler to directly observe the sampling operation. In addition, sample handling and manipulation increases in difficulty with increasing depth of water. The bucket auger is used to bore a hole to the upper range of the desired sampling depth and then withdrawn. The tube auger is then lowered down the borehole, and driven into the sediment to the lower range of the desired sampling depth. The tube is then withdrawn and the sample recovered from the tube. This method can be used to collect firmly consolidated sediments, but is somewhat limited by the depth of the aqueous layer, and the integrity of the initial borehole.

The following procedure will be used to collect deep sediment samples with a bucket auger and a tube auger:

1. Attach the bucket auger bit to the required lengths of extensions, then attach the "T" handle to the upper extension.
2. Clear the area to be sampled of any surface debris.
3. Begin augering, periodically removing any accumulated sediment (i.e., cuttings) from the auger bucket. Cuttings should be disposed of far enough from the sampling area to minimize cross contamination of various depths.
4. After reaching the upper range of the desired depth, slowly and carefully remove bucket auger from the boring.
5. Attach the tube auger bit to the required lengths of extensions, then attach the "T" handle to the upper extension.
6. Carefully lower tube auger down borehole using care to avoid making contact with the borehole sides and, thus, cross contaminating the sample. Gradually force tube auger into sediment to the lower range of the desired sampling depth. Hammering of the tube auger to facilitate coring should be avoided as the vibrations may cause the boring walls

to collapse.

7. Remove tube auger from the borehole, again taking care to avoid making contact with the borehole sides and, thus, cross contaminating the sample.
8. Discard the top of core (approximately 1 inch); as this represents material collected by the tube auger before penetration to the layer of concern.
9. Transfer sample into an appropriate sample or homogenization container. Ensure that non-dedicated containers have been adequately decontaminated.

#### 7.2.4 Sampling Surface Sediment with an Ekman or Ponar Dredge from Beneath a Shallow or Deep Aqueous Layer

For the purpose of this method, surface sediment is considered to range from 0 to six inches in depth. Collection of surface sediment can be accomplished with a system consisting of a remotely activated device (dredge) and a deployment system. This technique consists of lowering a sampling device (dredge) to the surface of the sediment by use of a rope, cable, or extended handle. The mechanism is activated, and the device entraps sediment in spring loaded or lever operated jaws.

An Ekman dredge is a lightweight sediment sampling device with spring activated jaws. It is used to collect moderately consolidated, fine textured sediment. The following procedure will be used for collecting sediment with an Ekman dredge (Figure 2, Appendix A):

1. Attach a sturdy nylon rope or stainless steel cable through the hole on the top of the bracket, or secure the extension handle to the bracket with machine bolts.
2. Attach springs to both sides of the jaws. Fix the jaws so that they are in open position by placing trip cables over the release studs. Ensure that the hinged doors on the dredge top are free to open.
3. Lower the sampler to a point 4 to 6 inches

above the sediment surface.

4. Drop the sampler to the sediment.
5. Trigger the jaw release mechanism by lowering a messenger down the line, or by depressing the button on the upper end of the extension handle.
6. Raise the sampler and slowly decant any free liquid through the top of the sampler. Care should be taken to retain the fine sediment fraction during this procedure.
7. Open the dredge jaws and transfer the sample into a stainless steel, plastic or other appropriate composition (e.g., Teflon) container. Ensure that non-dedicated containers have been adequately decontaminated. If necessary, continue to collect additional sediment grabs until sufficient material has been secured to fulfill analytical requirements. Thoroughly homogenize and then transfer sediment to sample containers appropriate for the analyses requested. Samples for volatile organic analysis must be collected directly from the bucket before homogenization to minimize volatilization of contaminants.

A Ponar dredge is a heavyweight sediment sampling device with weighted jaws that are lever or spring activated. It is used to collect consolidated fine to coarse textured sediment. The following procedure will be used for collecting sediment with a Ponar dredge (Figure 3, Appendix A):

1. Attach a sturdy nylon rope or steel cable to the ring provided on top of the dredge.
2. Arrange the Ponar dredge with the jaws in the open position, setting the trip bar so the sampler remains open when lifted from the top. If the dredge is so equipped, place the spring loaded pin into the aligned holes in the trip bar.
3. Slowly lower the sampler to a point approximately two inches above the sediment.
4. Drop the sampler to the sediment. Slack on

the line will release the trip bar or spring loaded pin; pull up sharply on the line closing the dredge.

5. Raise the dredge to the surface and slowly decant any free liquid through the screens on top of the dredge. Care should be taken to retain the fine sediment fraction during this operation.
6. Open the dredge and transfer the sediment to a stainless steel, plastic or other appropriate composition (e.g., Teflon) container. Ensure that non-dedicated containers have been adequately decontaminated. If necessary, continue to collect additional sediment until sufficient material has been secured to fulfill analytical requirements. Thoroughly homogenized and then transfer sediment to sample containers appropriate for the analyses requested. Samples for volatile organic analysis must be collected directly from the bucket before homogenization to minimize volatilization of contaminants.

### 7.2.5 Sampling Subsurface Sediment with a Coring Device from Beneath a Shallow Aqueous Layer

For purposes of this method, subsurface sediment is considered to range from 6 to 24 inches in depth and a shallow aqueous layer is considered to range from 0 to 24 inches in depth. Collection of subsurface sediment from beneath a shallow aqueous layer can be accomplished with a system consisting of a tube sampler, acetate tube, eggshell check valve, nosecone, extensions, and "T" handle, or drivehead. The use of additional extensions can increase the depth of water from which sediment can be collected from 24 inches to 10 feet or more. This sampler may be used with either a drive hammer for firm sediment, or a "T" handle for soft sediment. However, sample handling and manipulation increases in difficulty with increasing depth of water.

The following procedure describes the use of a sample coring device (Figure 4, Appendix A) used to collect subsurface sediments.

1. Assemble the coring device by inserting the acetate core into the sampling tube.

2. Insert the "egg shell" check valve into the lower end of the sampling tube with the convex surface positioned inside the acetate core.
3. Screw the nosecone onto the lower end of the sampling tube, securing the acetate tube and eggshell check valve.
4. Screw the handle onto the upper end of the sampling tube and add extension rods as needed.
5. Place the sampler in a perpendicular position on the sediment to be sampled.
6. If the "T" handle is used, place downward pressure on the device until the desired depth is reached. After the desired depth is reached, rotate the sampler to shear off the core at the bottom. Slowly withdraw the sampler from the sediment and proceed to Step 15.
7. If the drive hammer is selected, insert the tapered handle (drive head) of the drive hammer through the drive head.
8. Drive the sampler into the sediment to the desired depth.
9. Record the length of the tube that penetrated the sample material, and the number of blows required to obtain this depth.
10. Remove the drive hammer and fit the keyhole-like opening on the flat side of the hammer onto the drive head. In this position, the hammer serves as a handle for the sampler.
11. Rotate the sampler to shear off the core at the bottom.
12. Lower the sampler handle (hammer) until it just clears the two ear-like protrusions on the drive head, and rotate about 90°.
13. Slowly withdraw the sampler from the sediment. If the drivehead was used, pull the hammer upwards and dislodge the sampler from the sediment.

14. Carefully remove the coring device from the water.
15. Unscrew the nosecone and remove the eggshell check valve.
16. Slide the acetate core out of the sampler tube. Decant surface water, using care to retain the fine sediment fraction. If head space is present in the upper end, a hacksaw may be used to shear the acetate tube off at the sediment surface. The acetate core may then be capped at both ends. Indicate on the acetate tube the appropriate orientation of the sediment core using a waterproof marker. The sample may be used in this fashion, or the contents transferred to a sample or homogenization container.
17. Open the acetate tube and transfer the sediment to a stainless steel, plastic or other appropriate composition (e.g., Teflon) container. Ensure that non-dedicated containers have been adequately decontaminated. If necessary, continue to collect additional sediment until sufficient material has been secured to fulfill analytical requirements. Thoroughly homogenize and then transfer sediment to sample containers appropriate for the analyses requested. Samples for volatile organic analysis must be collected directly from the bucket before homogenization to minimize volatilization of contaminants.

## **8.0 CALCULATIONS**

This section is not applicable to this SOP.

## **9.0 QUALITY ASSURANCE/ QUALITY CONTROL**

There are no specific quality assurance (QA) activities which apply to the implementation of these procedures. However, the following QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

## **10.0 DATA VALIDATION**

This section is not applicable to this SOP.

## **11.0 HEALTH AND SAFETY**

When working with potentially hazardous materials, follow U.S. EPA/OSHA and Corporate health and safety procedures.

More specifically, when sampling sediment from waterbodies, physical hazards must be identified and adequate precautions must be taken to ensure the safety of the sampling team. The team member collecting the sample should not get too close to the edge of the waterbody, where bank failure may cause loss of balance. To prevent this, the person performing the sampling should be on a lifeline, and be wearing adequate protective equipment. If sampling from a vessel is determined to be necessary, appropriate protective measures must be implemented.

## **12.0 REFERENCES**

Mason, B.J., Preparation of Soil Sampling Protocol: Technique and Strategies. 1983 EPA-600/4-83-020.

Barth, D.S. and B.J. Mason, Soil Sampling Quality Assurance User's Guide. 1984 EPA-600/4-84-043.

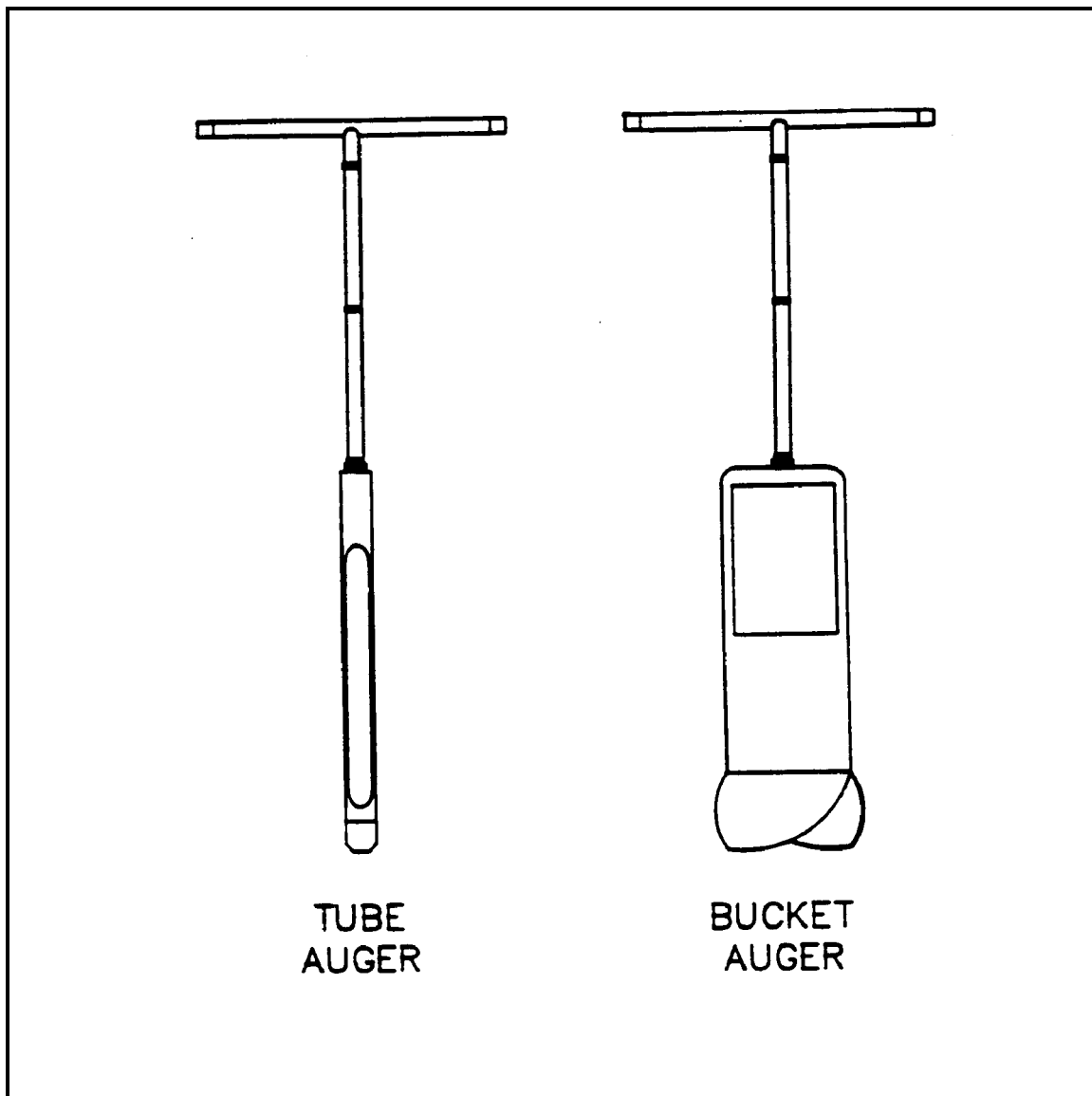
U.S. EPA. Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition. 1984 EPA-600/4-84-076.

de Vera, E.R., B.P. Simmons, R.D. Stephen, and D.L. Storm. Samplers and Sampling Procedures for Hazardous Waste Streams. 1980 EPA-600/2-80-018.

## APPENDIX A

### Figures

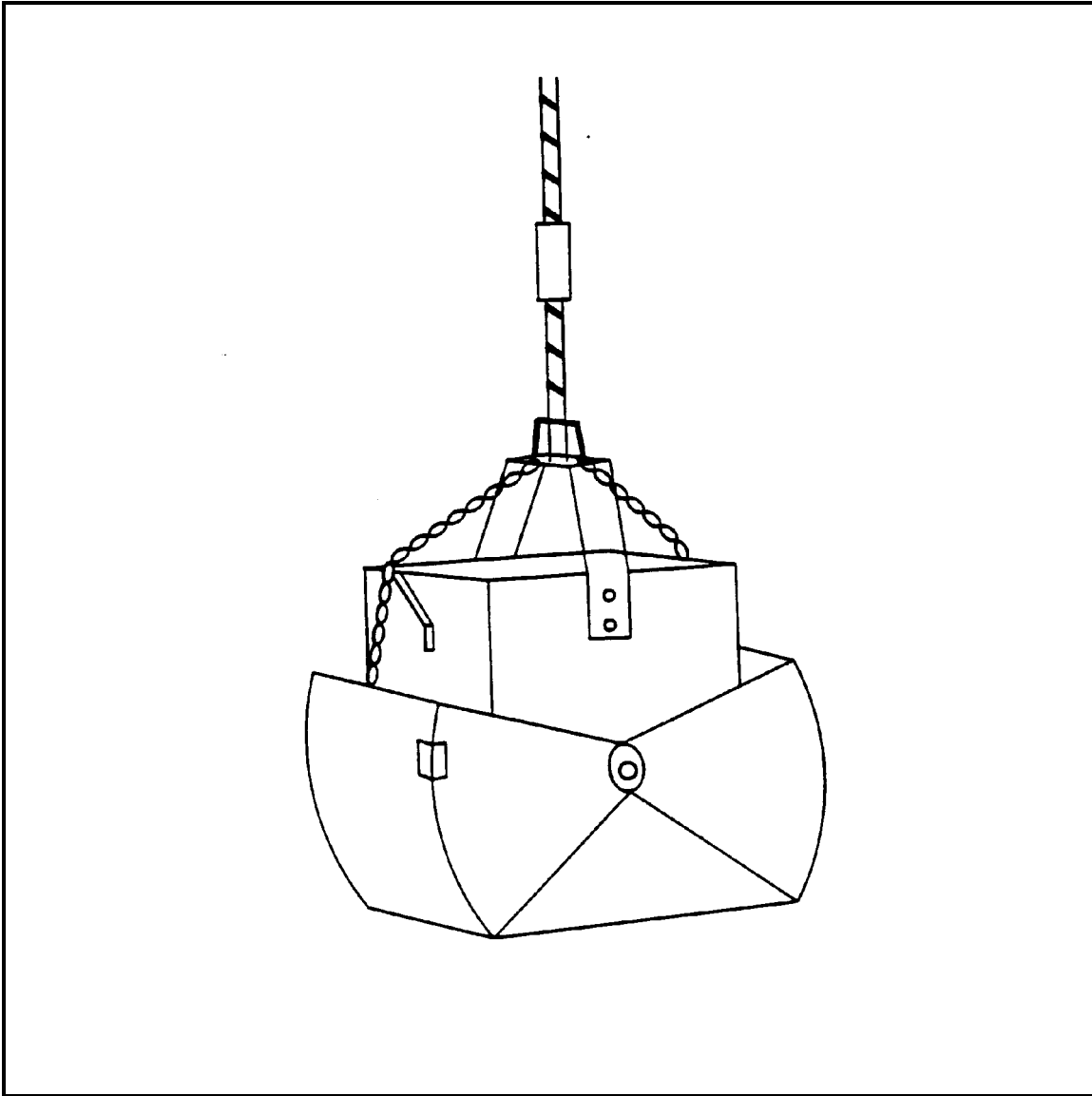
FIGURE 1. Sampling Auger



## APPENDIX A (Cont'd)

### Figures

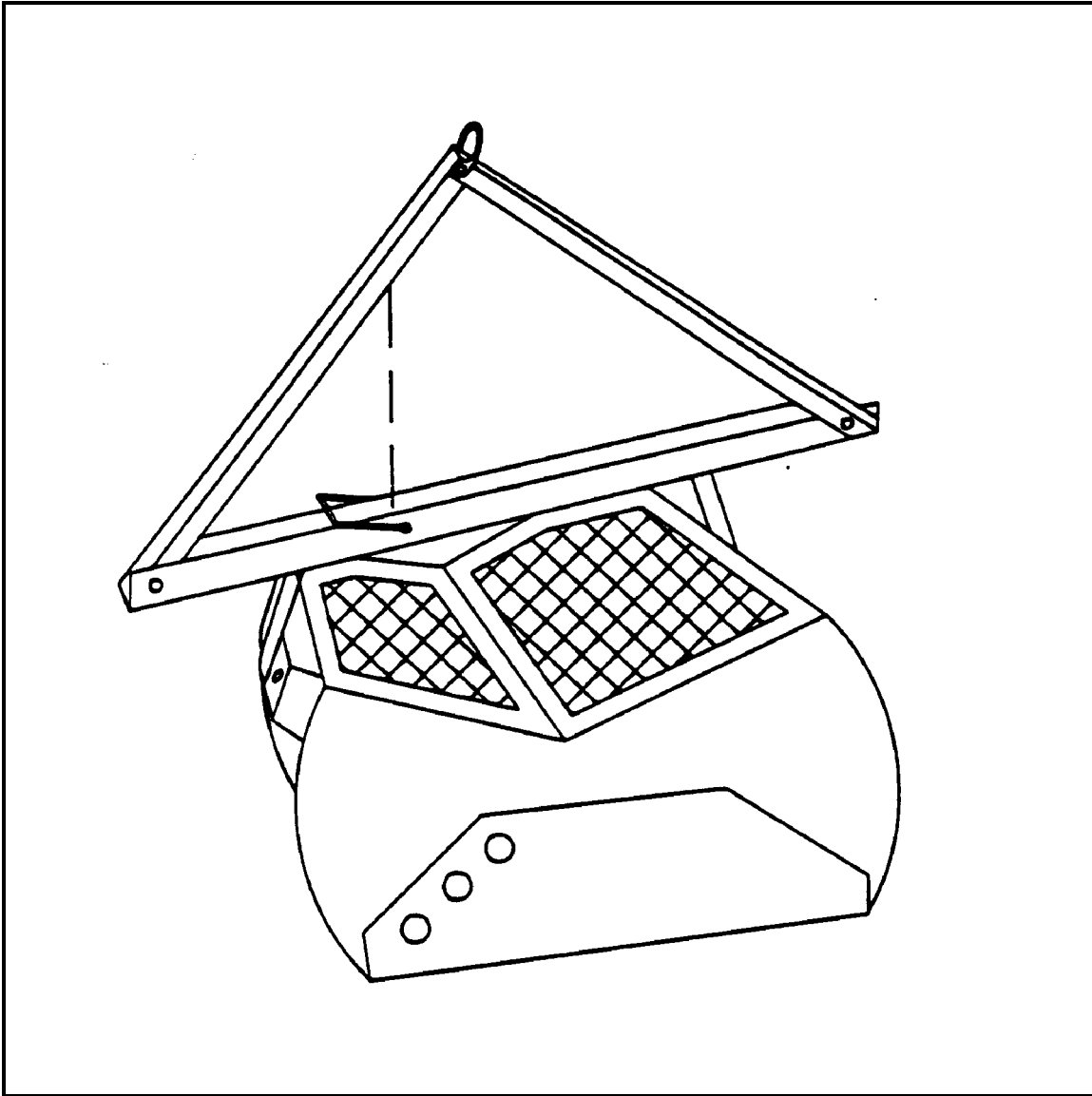
FIGURE 2. Ekman Dredge



## APPENDIX A (Cont'd)

### Figures

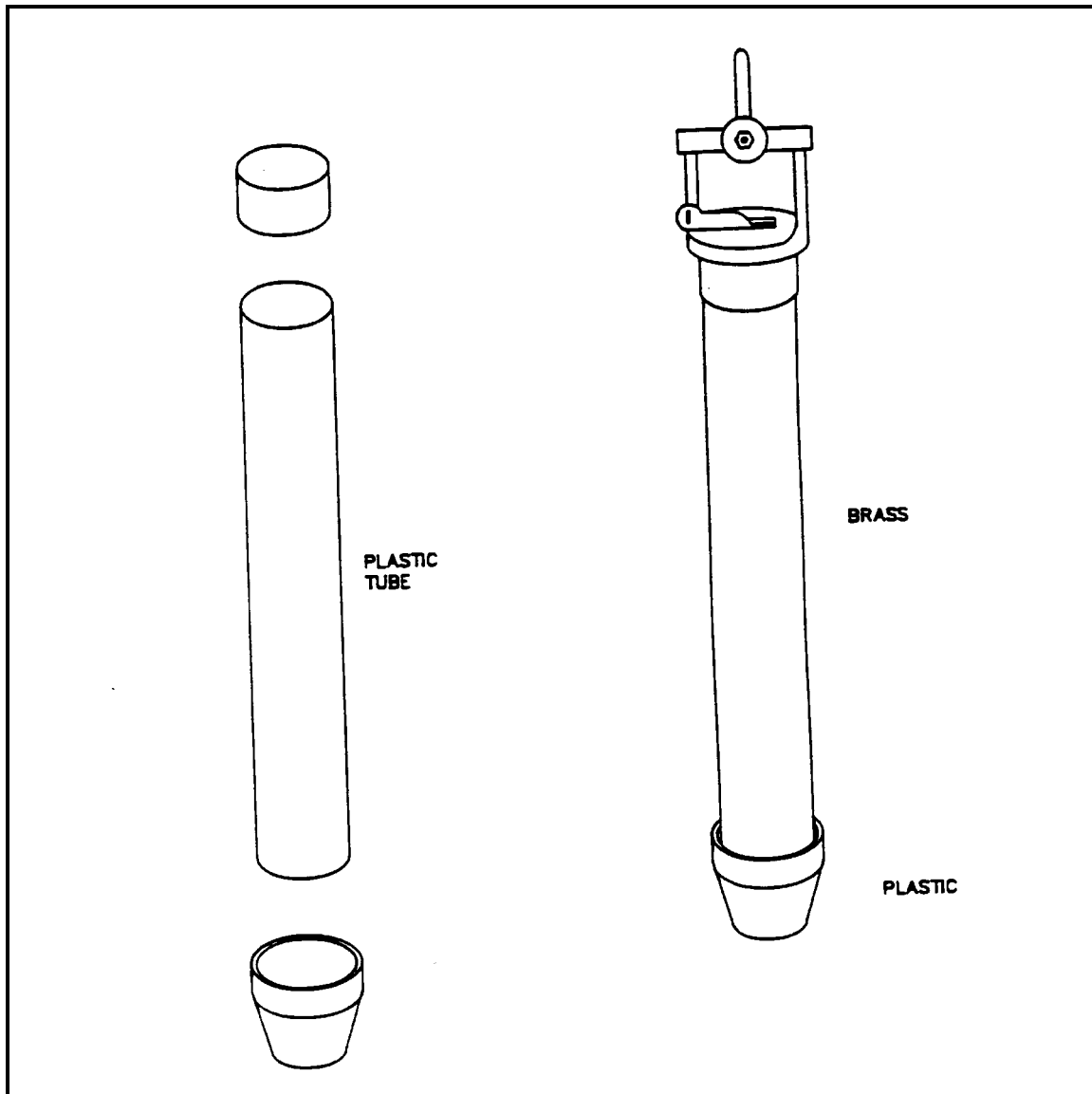
FIGURE 3. Ponar Dredge



## APPENDIX A (Cont'd)

### Figures

FIGURE 4. Sample Coring Device



**APPENDIX D**

**LABORATORY ANALYTE LIST AND REPORTING LIMITS**

## SOM01.2 Volatile Target Compound List and Corresponding CRQLs

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Dichlorodifluoromethane	75-71-8	--	0.50	5.0	5.0	250
<a href="#">Chloromethane</a>	74-87-3	--	0.50	5.0	5.0	250
<a href="#">Vinyl chloride</a>	75-01-4	--	0.50	5.0	5.0	250
Bromomethane	74-83-9	--	0.50	5.0	5.0	250
<a href="#">Chloroethane</a>	75-00-3	--	0.50	5.0	5.0	250
Trichlorofluoromethane	75-69-4	--	0.50	5.0	5.0	250
<a href="#">1,1-Dichloroethene</a>	75-35-4	--	0.50	5.0	5.0	250
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	--	0.50	5.0	5.0	250
<a href="#">Acetone</a>	67-64-1	--	5.0	10	10	500
<a href="#">Carbon disulfide</a>	75-15-0	--	0.50	5.0	5.0	250
Methyl acetate	79-20-9	--	0.50	5.0	5.0	250

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">Methylene chloride</a>	75-09-2	--	0.50	5.0	5.0	250
trans-1,2-Dichloroethene	156-60-5	--	0.50	5.0	5.0	250
<a href="#">Methyl tert-butyl ether</a>	1634-04-4	--	0.50	5.0	5.0	250
<a href="#">1,1-Dichloroethane</a>	75-34-3	--	0.50	5.0	5.0	250
<a href="#">cis-1,2-Dichloroethene</a>	156-59-2	--	0.50	5.0	5.0	250
<a href="#">2-Butanone</a>	78-93-3	--	5.0	10	10	500
Bromochloromethane	74-97-5	--	0.50	5.0	5.0	250
<a href="#">Chloroform</a>	67-66-3	--	0.50	5.0	5.0	250
<a href="#">1,1,1-Trichloroethane</a>	71-55-6	--	0.50	5.0	5.0	250
Cyclohexane	110-82-7	--	0.50	5.0	5.0	250
<a href="#">Carbon tetrachloride</a>	56-23-5	--	0.50	5.0	5.0	250
Benzene	71-43-2	--	0.50	5.0	5.0	250

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">1,2-Dichloroethane</a>	107-06-2	--	0.50	5.0	5.0	250
1,4-Dioxane	123-91-1	--	--	100	100	5000
<a href="#">Trichloroethene</a>	79-01-6	--	0.50	5.0	5.0	250
Methylcyclohexane	108-87-2	--	0.50	5.0	5.0	250
<a href="#">1,2-Dichloropropane</a>	78-87-5	--	0.50	5.0	5.0	250
<a href="#">Bromodichloromethane</a>	75-27-4	--	0.50	5.0	5.0	250
<a href="#">cis-1,3-Dichloropropene</a>	10061-01-5	--	0.50	5.0	5.0	250
4-Methyl-2-pentanone	108-10-1	--	5.0	10	10	500
<a href="#">Toluene</a>	108-88-3	--	0.50	5.0	5.0	250
trans-1,3-Dichloropropene	10061-02-6	--	0.50	5.0	5.0	250
<a href="#">1,1,2-Trichloroethane</a>	79-00-5	--	0.50	5.0	5.0	250
<a href="#">Tetrachloroethene</a>	127-18-4	--	0.50	5.0	5.0	250

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">2-Hexanone</a>	591-78-6	--	5.0	10	10	500
<a href="#">Dibromochloromethane</a>	124-48-1	--	0.50	5.0	5.0	250
<a href="#">1,2-Dibromoethane</a>	106-93-4	0.050	0.50	5.0	5.0	250
<a href="#">Chlorobenzene</a>	108-90-7	--	0.50	5.0	5.0	250
<a href="#">Ethylbenzene</a>	100-41-4	--	0.50	5.0	5.0	250
<a href="#">o-Xylene</a>	95-47-6	--	0.50	5.0	5.0	250
<a href="#">m,p-Xylene</a>	179601-23-1	--	0.50	5.0	5.0	250
<a href="#">Styrene</a>	100-42-5	--	0.50	5.0	5.0	250
<a href="#">Bromoform</a>	75-25-2	--	0.50	5.0	5.0	250
Isopropylbenzene	98-82-8	--	0.50	5.0	5.0	250
<a href="#">1,1,2,2-Tetrachloroethane</a>	79-34-5	--	0.50	5.0	5.0	250
<a href="#">1,3-Dichlorobenzene</a>	541-73-1	--	0.50	5.0	5.0	250

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Trace Water by SIM (ug/L)	Trace Water (ug/L)	Low Water (ug/L)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">1,4-Dichlorobenzene</a>	106-46-7	--	0.50	5.0	5.0	250
<a href="#">1,2-Dichlorobenzene</a>	95-50-1	--	0.50	5.0	5.0	250
<a href="#">1,2-Dibromo-3-chloropropane</a>	96-12-8	0.050	0.50	5.0	5.0	250
1,2,4-Trichlorobenzene	120-82-1	--	0.50	5.0	5.0	250
1,2,3-Trichlorobenzene	87-61-6	--	0.50	5.0	5.0	250

## SOM01.2 Semivolatile Target Compound List and Corresponding CRQLs

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Benzaldehyde	100-52-7	--	5.0	--	170	5,000
<a href="#">Phenol</a>	108-95-2	--	5.0	--	170	5,000
<a href="#">Bis(2-chloroethyl) ether</a>	111-44-4	--	5.0	--	170	5,000
<a href="#">2-Chlorophenol</a>	95-57-8	--	5.0	--	170	5,000
2-Methylphenol	95-48-7	--	5.0	--	170	5,000
2,2'-Oxybis(1-choloropropane)	108-60-1	--	5.0	--	170	5,000
Acetophenone	98-86-2	--	5.0	--	170	5,000
4-Methylphenol	106-44-5	--	5.0	--	170	5,000
N-Nitroso-di-n propylamine	621-64-7	--	5.0	--	170	5,000
<a href="#">Hexachloroethane</a>	67-72-1	--	5.0	--	170	5,000

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">Nitrobenzene</a>	98-95-3	--	5.0	--	170	5,000
<a href="#">Isophorone</a>	78-59-1	--	5.0	--	170	5,000
<a href="#">2-Nitrophenol</a>	88-75-5	--	5.0	--	170	5,000
2,4-Dimethylphenol	105-67-9	--	5.0	--	170	5,000
Bis(2-chloroethoxy) methane	111-91-1	--	5.0	--	170	5,000
<a href="#">2,4-Dichlorophenol</a>	120-83-2	--	5.0	--	170	5,000
<a href="#">Naphthalene</a>	91-20-3	0.10	5.0	3.3	170	5,000
4-Chloroaniline	106-47-8	--	5.0	--	170	5,000
<a href="#">Hexachlorobutadiene</a>	87-68-3	--	5.0	--	170	5,000
Caprolactam	105-60-2	--	5.0	--	170	5,000
4-Chloro-3-methylphenol	59-50-7	--	5.0	--	170	5,000
<a href="#">2-Methylnaphthalene</a>	91-57-6	0.10	5.0	3.3	170	5,000

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
Hexachlorocyclopentadiene	77-47-4	--	5.0	--	170	5,000
<a href="#">2,4,6-Trichlorophenol</a>	88-06-2	--	5.0	--	170	5,000
<a href="#">2,4,5-Trichlorophenol</a>	95-95-4	--	5.0	--	170	5,000
1,1'-Biphenyl	92-52-4	--	5.0	--	170	5,000
2-Chloronaphthalene	91-58-7	--	5.0	--	170	5,000
2-Nitroaniline	88-74-4	--	10	--	330	10,000
Dimethylphthalate	131-11-3	--	5.0	--	170	5,000
<a href="#">2,6-Dinitrotoluene</a>	606-20-2	--	5.0	--	170	5,000
<a href="#">Acenaphthylene</a>	208-96-8	0.10	5.0	3.3	170	5,000
3-Nitroaniline	99-09-2	--	10	--	330	10,000
<a href="#">Acenaphthene</a>	83-32-9	0.10	5.0	3.3	170	5,000
<a href="#">2,4-Dinitrophenol</a>	51-28-5	--	10	--	330	10,000

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">4-Nitrophenol</a>	100-02-7	--	10	--	330	10,000
Dibenzofuran	132-64-9	--	5.0	--	170	5,000
<a href="#">2,4-Dinitrotoluene</a>	121-14-2	--	5.0	--	170	5,000
Diethylphthalate	84-66-2	--	5.0	--	170	5,000
<a href="#">Fluorene</a>	86-73-7	0.10	5.0	3.3	170	5,000
4-Chlorophenyl-phenyl ether	7005-72-3	--	5.0	--	170	5,000
4-Nitroaniline	100-01-6	--	10	--	330	10,000
4,6-Dinitro-2-methylphenol	534-52-1	--	10	--	330	10,000
<a href="#">N-Nitrosodiphenylamine</a>	86-30-6	--	5.0	--	170	5,000
1,2,4,5-Tetrachlorobenzene	95-94-3	--	5.0	--	170	5,000
4-Bromophenyl-phenylether	101-55-3	--	5.0	--	170	5,000
<a href="#">Hexachlorobenzene</a>	118-74-1	--	5.0	--	170	5,000

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">Atrazine</a>	1912-24-9	--	5.0	--	170	5,000
<a href="#">Pentachlorophenol</a>	87-86-5	0.20	10	6.7	330	10,000
<a href="#">Phenanthrene</a>	85-01-8	0.10	5.0	3.3	170	5,000
<a href="#">Anthracene</a>	120-12-7	0.10	5.0	3.3	170	5,000
Carbazole	86-74-8	--	5.0	--	170	5,000
<a href="#">Di-n-butylphthalate</a>	84-74-2	--	5.0	--	170	5,000
<a href="#">Fluoranthene</a>	206-44-0	0.10	5.0	3.3	170	5,000
<a href="#">Pyrene</a>	129-00-0	0.10	5.0	3.3	170	5,000
Butylbenzylphthalate	85-68-7	--	5.0	--	170	5,000
<a href="#">3,3'-dichlorobenzidine</a>	91-94-1	--	5.0	--	170	5,000
<a href="#">Benzo(a)anthracene</a>	56-55-3	0.10	5.0	3.3	170	5,000
<a href="#">Chrysene</a>	218-01-9	0.10	5.0	3.3	170	5,000

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS				
		Low Water by SIM (ug/L)	Low Water (ug/L)	Low Soil by SIM (ug/kg)	Low Soil (ug/kg)	Med. Soil (ug/kg)
<a href="#">Bis(2-ethylhexyl) phthalate</a>	117-81-7	--	5.0	--	170	5,000
<a href="#">Di-n-octylphthalate</a>	117-84-0	--	5.0	--	170	5,000
<a href="#">Benzo(b) fluoranthene</a>	205-99-2	0.10	5.0	3.3	170	5,000
<a href="#">Benzo(k) fluoranthene</a>	207-08-9	0.10	5.0	3.3	170	5,000
<a href="#">Benzo(a) pyrene</a>	50-32-8	0.10	5.0	3.3	170	5,000
<a href="#">Indeno(1,2,3.-cd) pyrene</a>	193-39-5	0.10	5.0	3.3	170	5,000
<a href="#">Dibenzo(a,h) anthracene</a>	53-70-3	0.10	5.0	3.3	170	5,000
<a href="#">Benzo(g,h,i) perylene</a>	191-24-2	0.10	5.0	3.3	170	5,000
<a href="#">2,3,4,6-Tetrachlorophenol</a>	58-90-2	--	5.0	--	170	5,000

## SOM01.2 Pesticides/Aroclors Target Compound List and Corresponding CRQLs

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS	
		Water (ug/L)	Soil (ug/Kg)
<a href="#">alpha-BHC</a>	319-84-6	0.050	1.7
<a href="#">beta-BHC</a>	319-85-7	0.050	1.7
<a href="#">delta-BHC</a>	319-86-8	0.050	1.7
<a href="#">gamma-BHC (Lindane)</a>	58-89-9	0.050	1.7
Heptachlor	76-44-8	0.050	1.7
<a href="#">Aldrin</a>	309-00-2	0.050	1.7
Heptachlor epoxide	1024-57-3	0.050	1.7
<a href="#">Endosulfan I</a>	959-98-8	0.050	1.7
<a href="#">Dieldrin</a>	60-57-1	0.10	3.3
<a href="#">4,4'-DDE</a>	72-55-9	0.10	3.3
<a href="#">Endrin</a>	72-20-8	0.10	3.3

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS	
		Water (ug/L)	Soil (ug/Kg)
<a href="#">Endosulfan II</a>	33213-65-9	0.10	3.3
<a href="#">4,4'-DDD</a>	72-54-8	0.10	3.3
<a href="#">Endosulfan sulfate</a>	1031-07-8	0.10	3.3
<a href="#">4,4'-DDT</a>	50-29-3	0.10	3.3
<a href="#">Methoxychlor</a>	72-43-5	0.50	17.0
<a href="#">Endrin ketone</a>	53494-70-5	0.10	3.3
<a href="#">Endrin aldehyde</a>	7421-93-4	0.10	3.3
<a href="#">alpha-Chlordane</a>	5103-71-9	0.050	1.7
<a href="#">gamma-Chlordane</a>	5103-74-2	0.050	1.7
<a href="#">Toxaphene</a>	8001-35-2	5.0	170.0
<a href="#">Aroclor-1016</a>	12674-11-2	1.0	33.0

COMPOUND	CAS No.	SOM01.2 CONTRACT REQUIRED QUANTITATION LIMITS	
		Water (ug/L)	Soil (ug/Kg)
<a href="#">Aroclor-1221</a>	11104-28-2	1.0	33.0
<a href="#">Aroclor-1232</a>	11141-16-5	1.0	33.0
<a href="#">Aroclor-1242</a>	53469-21-9	1.0	33.0
<a href="#">Aroclor-1248</a>	12672-29-6	1.0	33.0
<a href="#">Aroclor-1254</a>	11097-69-1	1.0	33.0
<a href="#">Aroclor-1260</a>	11096-82-5	1.0	33.0
<a href="#">Aroclor-1262</a>	37324-23-5	1.0	33.0
<a href="#">Aroclor-1268</a>	11100-14-4	1.0	33.0

## ISM01.3 Metals and Cyanide Target Analyte List and Corresponding CRQLs

The quantitation limits detailed in the table below are provided as a summary only. For full details regarding ISM01.3 target analytes and Contract Required Quantitation Limits (CRQLs), please refer to Exhibit C of the [ISM01.3 Statement of Work \(SOW\)](#).

ANALYTE	CAS No.	ISM01.3 CONTRACT REQUIRED QUANTITATION LIMITS					
		ICP-AES Water (ug/L)	ICP-AES Soil (mg/kg)	ICP-AES Wipes (ug)	ICP-AES Filters (ug)	ICP-MS Water (ug/L)	ICP-MS Soil (mg/kg)
<a href="#">Aluminum</a>	7429-90-5	200	20	20	2	20	--
<a href="#">Antimony</a>	7440-36-0	60	6	6	0.6	2	1
<a href="#">Arsenic</a>	7440-38-2	10	1	1	0.1	1	0.5
<a href="#">Barium</a>	7440-39-3	200	20	20	2	10	5
<a href="#">Beryllium</a>	7440-41-7	5	0.5	0.5	0.05	1	0.5
<a href="#">Cadmium</a>	7440-43-9	5	0.5	0.5	0.05	1	0.5
Calcium	7440-70-2	5000	500	500	50	500	--
<a href="#">Chromium</a>	7440-47-3	10	1	1	0.10	2	1
<a href="#">Cobalt</a>	7440-48-4	50	5	5	0.5	1	0.5

ANALYTE	CAS No.	ISM01.3 CONTRACT REQUIRED QUANTITATION LIMITS					
		ICP-AES Water (ug/L)	ICP-AES Soil (mg/kg)	ICP-AES Wipes (ug)	ICP-AES Filters (ug)	ICP-MS Water (ug/L)	ICP-MS Soil (mg/kg)
<a href="#">Copper</a>	7440-50-8	25	2.5	2.5	0.25	2	1
Iron	7439-89-6	100	10	10	1	200	--
<a href="#">Lead</a>	7439-92-1	10	1	1	0.1	1	0.5
Magnesium	7439-95-4	5000	500	500	50	500	--
<a href="#">Manganese</a>	7439-96-5	15	1.5	1.5	0.15	1	0.5
<a href="#">Nickel</a>	7440-02-0	40	4	4	0.4	1	0.5
Potassium	7440-09-7	5000	500	500	50	500	--
<a href="#">Selenium</a>	7782-49-2	35	3.5	3.5	0.35	5	2.5
<a href="#">Silver</a>	7440-22-4	10	1	1	0.10	1	0.5
Sodium	7440-23-5	5000	500	500	50	500	--
<a href="#">Thallium</a>	7440-28-0	25	2.5	2.5	0.25	1	0.5
<a href="#">Vanadium</a>	7440-62-2	50	5	5	0.5	5	2.5

ANALYTE	CAS No.	ISM01.3 CONTRACT REQUIRED QUANTITATION LIMITS					
		ICP-AES Water (ug/L)	ICP-AES Soil (mg/kg)	ICP-AES Wipes (ug)	ICP-AES Filters (ug)	ICP-MS Water (ug/L)	ICP-MS Soil (mg/kg)
<a href="#">Zinc</a>	7440-66-6	60	6	6	0.60	2	1
Additional Analytes					CAS No.	Water (ug/L)	Soil (mg/kg)
Mercury by Cold Vapor Atomic Absorption (CVAA)					7439-97-6	0.2	0.1
Cyanide by Spectrophotometry					57-12-5	10	0.5

**APPENDIX E**

**EPA REGION 6 REGIONAL SCREENING LEVELS**

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																														
Toxicity and Chemical-specific Information													Contaminant					Screening Levels										Protection of Ground Water SSLs		
SFO (mg/kg-day) <sup>1</sup>	k <sub>e</sub> y	IUR (ug/m <sup>3</sup> ) <sup>1</sup>	k <sub>e</sub> y	RfD <sub>o</sub> (mg/kg-day)	k <sub>e</sub> y	RfC <sub>i</sub> (mg/m <sup>3</sup> )	k <sub>e</sub> y	v <sub>o</sub> c	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)			
1.8E-02 8.7E-03	C	5.1E-06 2.2E-06	C	1.5E-01 4.0E-03	I					1 1	0.1 0.1		ALAR Acephate Acetaldehyde	1596-84-5 30560-19-1 75-07-0	2.7E+01 5.6E+01 1.0E+01	c c** c**	9.6E+01 2.0E+02 5.2E+01	c c** c**	4.8E-01 2.0E+02 1.1E+00	c c** c**	2.4E+00 5.6E+00 5.6E+00	c c** c**	3.7E+00 7.7E+00 2.2E+00	c c** c**		8.2E-04 1.7E-03 4.5E-04				
				2.0E-02 9.0E-01 3.0E-03	I I P					1 1 1	0.1 0.1 0.1	1.1E+05	Acetochlor Acetone Acetone Cyanohydrin	34256-82-1 67-64-1 75-86-5	1.2E+03 6.1E+04 2.0E+02	n n n	1.2E+04 6.3E+05 2.1E+03	n n n	3.2E+04 n 6.3E+01	n n n	1.4E+05 n 2.6E+02	n n n	2.7E+02 n 3.4E+01	n n n		2.2E-01 2.4E+00 6.9E-03				
				1.0E-01	I	6.0E-02	I	V		1		1.3E+05 2.5E+03	Acetonitrile Acetophenone Acetylaminofluorene, 2-	75-05-8 98-86-2 53-96-3	8.7E+02 7.8E+03 1.3E-01	n ns c	3.7E+03 1.0E+05 4.5E-01	n nms c	6.3E+01 n 1.9E-03	n n c	2.6E+02 n 9.4E-03	n n c	1.3E+02 n 1.4E-02	n n c		2.6E-02 4.5E-01 6.5E-05				
3.8E+00	C	1.3E-03	C							1	0.1	2.3E+04	Acrolein Acrylamide Acrylic Acid	107-02-8 79-06-1 79-10-7	1.5E-01 2.3E-01 3.0E+04	n c n	6.5E-01 3.4E+00 2.9E+05	n nm nm	2.1E-02 9.6E-03 1.0E+00	n c n	8.8E-02 1.2E-01 4.4E+00	n c n	4.1E-02 c 7.7E+03	n n n		8.4E-06 9.1E-06 1.6E+00				
5.4E-01 5.6E-02	I C	6.8E-05	I	4.0E-02 1.0E-02	A I	2.0E-03 6.0E-03	I P	V M		1 1	0.1 0.1	1.1E+04	Acrylonitrile Adiponitrile Alachlor	107-13-1 111-69-3 15972-60-8	2.4E-01 8.5E+06 8.7E+00	c* nm c	1.2E+00 3.6E+07 3.1E+01	c* nm c	3.6E-02 6.3E+00 n	c* n n	1.8E-01 2.6E+01 n	c* n n	4.5E-02 n 9.1E-01	c* n c	2.0E+00	9.8E-06 7.5E-04 1.6E-03				
				1.0E-03 1.0E-03 1.7E+01	I I I					1 1 1	0.1 0.1 0.1		Aldicarb Aldicarb Sulfone Aldrin	116-06-3 1646-88-4 309-00-2	6.1E+01 6.1E+01 2.9E-02	n n c*	6.2E+02 n 1.0E-01	n n c			5.0E-04 c	2.5E-03 c	2.1E-04 c		3.8E-03 3.4E-03 3.4E-05					
				2.5E-01 5.0E-03	I I	1.0E-04 1.0E-03	I I	V		1 1	0.1 0.1	1.4E+03	Allyl Allyl Alcohol Allyl Chloride	74223-64-6 107-18-6 107-05-1	1.5E+04 3.0E+02 6.8E-01	n n c**	1.5E+05 3.1E+03 3.4E+00	nm nm c**			1.0E-01 n 4.1E-01	n n c**	4.4E-01 n 2.0E+00	n n c**	3.8E+03 n 6.3E-01	n n c**	1.5E+00 1.6E-02 2.0E-04			
				1.0E+00 4.0E-04 3.0E-04	P I I	5.0E-03	P			1 1 1			Aluminum Aluminum Phosphide Amdro	7429-90-5 20859-73-8 67485-29-4	7.7E+04 3.1E+01 1.8E+01	n n n	9.9E+05 4.1E+02 1.8E+02	nm n n	5.2E+00 n n	n n n	2.2E+01 n n	n n n	1.6E+04 6.2E+00 4.7E+00	n n n		2.3E+04 1.7E+03				
2.1E+01	C	6.0E-03	C	9.0E-03 8.0E-02	I P					1 1	0.1 0.1		Ametryn Aminobiphenyl, 4- Aminophenol, m-	834-12-8 92-67-1 591-27-5	5.5E+02 2.3E-02 4.9E+03	n c n	5.5E+03 8.2E-02 4.9E+04	n c n			4.1E-04 c	2.0E-03 c	1.2E+02 2.6E-03 1.2E+03	n c n		1.2E-01 1.3E-05 4.7E-01				
				2.0E-02 2.5E-03	P I					1 1	0.1 0.1		Aminophenol, p- Amitraz Ammonia	123-30-8 33089-61-1 7664-41-7	1.2E+03 1.5E+02 n	n n n	1.2E+04 1.5E+03 n	n n n			1.0E+02 n	4.4E+02 n	n		3.1E+02 5.9E+00 n	n	1.2E-01 3.0E+00			
5.7E-03 4.0E-02	I P	1.6E-06	C	2.0E-01 7.0E-03 2.0E-03	I I X	1.0E-03	I			1 1	0.1 0.1		Ammonium Sulfamate Aniline Anthraquinone, 9,10-	7773-06-0 62-53-3 84-65-1	1.6E+04 8.5E+01 1.2E+01	n c** c*	2.0E+05 3.0E+02 4.3E+01	nm c* c*			1.0E+00 n	4.4E+00 n	n		3.1E+03 n 1.2E+01	n c** c*	3.9E-03 1.2E-02			
				4.0E-04 5.0E-04 9.0E-04	I H H					0.15 0.15 0.15			Antimony (metallic) Antimony Pentoxide Antimony Potassium Tartrate	7440-36-0 1314-60-9 11071-15-1	3.1E+01 3.9E+01 7.0E+01	n n n	4.1E+02 5.1E+02 9.2E+02	n n n					6.0E+00 7.5E+00 1.3E+01	n n n	6.0E+00 n		2.7E-01 2.7E-01			
				4.0E-04 1.3E-02	H I	2.0E-04	I			0.15 0.15			Antimony Tetroxide Antimony Trioxide Apollo	1332-81-6 1309-64-4 74115-24-5	3.1E+01 2.8E+05 7.9E+02	n nm n	4.1E+02 1.2E+06 8.0E+03	n nm n			2.1E-01 n	8.8E-01 n	n		6.0E+00 n		1.1E+01			
2.5E-02 1.5E+00	I I	7.1E-06 4.3E-03	I	5.0E-02 3.0E-04 3.5E-06	H I C					1 1	0.1 0.03		Aramite Arsenic, Inorganic Arsine	140-57-8 7440-38-2 7784-42-1	1.9E+01 3.9E-01 2.7E-01	c c* n	6.9E+01 1.6E+00 3.6E+00	c c n	3.4E-01 5.7E-04 5.2E-02	c c* n	1.7E+00 2.9E-03 2.2E-01	c c* n	2.7E+00 4.5E-02 5.4E-02	c c n	1.0E+01	3.0E-02 1.3E-03	2.9E-01			
				9.0E-03 5.0E-02 3.5E-02	I I I					1 1 1	0.1 0.1 0.1		Assure Asulam Atrazine	76578-14-8 3337-71-1 1912-24-9	5.5E+02 3.1E+03 2.1E+00	n n n	5.5E+03 3.1E+04 7.5E+00	n n c					9.3E+01 7.8E+02 2.6E-01	n n c	3.0E+00	1.4E+00 2.0E-01 1.7E-04	1.9E-03			
8.8E-01 1.1E-01	C I	2.5E-04 3.1E-05	C I	4.0E-04	I					1 1	0.1 0.1		Auramine Avermectin B1 Azobenzene	492-80-8 65195-55-3 103-33-3	5.5E-01 2.4E+01 5.1E+00	c n c	2.0E+00 2.5E+02 2.3E+01	c n c	9.7E-03 n 7.8E-02	c n c	4.9E-02 n 4.0E-01	c n c	6.7E-02 6.3E+00 1.0E-01	c n c		6.1E-04 1.1E+01 8.0E-04				
				2.0E-01 4.0E-03 3.0E-02	I I I	5.0E-04	H			0.07 1 1			Barium Baygon Bayleton	7440-39-3 114-26-1 43121-43-3	1.5E+04 2.4E+02 1.8E+03	n n n	1.9E+05 2.5E+03 1.8E+04	nm n n			5.2E-01 n	2.2E+00 n	n		2.9E+03 6.1E+01 4.3E+02	n n n	2.0E+03 2.0E-02 3.4E-01	1.2E+02 2.0E-02 3.4E-01	8.2E+01	
				2.5E-02 3.0E-01 5.0E-02	I I I					1 1 1	0.1 0.1 0.1		Baythroid Benefin Benomyl	68359-37-5 1861-40-1 17804-35-2	1.5E+03 1.8E+04 3.1E+03	n n n	1.5E+04 1.8E+05 3.1E+04	n nm n					8.7E+01 n 7.5E+02	n n n		2.3E+01 4.1E+01 6.6E-01				
				3.0E-02 1.0E-01 4.0E-03	I I I					1 1	0.1 1.2E+03 1.8E+03		Bentazon Benzaldehyde Benzene	25057-89-0 100-52-7 71-43-2	1.8E+03 7.8E+03 1.1E+00	n ns c*	1.8E+04 1.0E+05 5.4E+00	n nms c*			3.1E-01 c	1.6E+00 c*	c*		4.4E+02 1.5E+03 3.9E-01	n n c*	5.0E+00	9.6E-02 3.3E-01 2.0E-04	2.6E-03	
				2.0E-04 1.0E-03 3.0E-03	X P I					1 1	0.1 1.3E+03 0.1		Benzenediamine-2-methyl sulfate, 1,4- Benzenethiol Benzidine	6369-59-1 108-98-5 92-87-5	1.2E+01 7.8E+01 5.0E-04	n c c	1.2E+02 1.0E+03 7.5E-03	n n c			1.4E-05 c	1.8E-04 c	c		3.1E+00 1.3E+01 9.2E-05	n n c		8.7E-04 8.6E-03 2.4E-07		
1.3E+01	I			4.0E+00 1.0E-01	I P					1 1	0.1 3.2E+02		Benzoic Acid Benzotrichloride Benzyl Alcohol	65-85-0 98-07-7 100-51-6	2.4E+05 4.9E-02 6.1E+03	nm c n	2.5E+06 2.2E-01 6.2E+04	nm c n					5.8E+04 2.6E-03 1.5E+03	n c n		1.4E+01 5.6E-06 3.7E-01				
1.7E-01	I	4.9E-05 2.4E-03	C I	2.0E-03 2.0E-03	P I	1.0E-03 2.0E-05	P I	V		1 0.007		1.5E+03	Benzyl Chloride Beryllium and compounds	100-44-7 7440-41-7	1.0E+00 1.6E+02	c* n	4.9E+00 2.0E+03	c* n	5.0E-02 1.0E-03	c* c*	2.5E-01 5.1E-03	c* c*	7.7E-02 1.6E+01	c* n	4.0E+00	8.4E-05 1.3E+01	3.2E+00			

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																													
Toxicity and Chemical-specific Information													Contaminant					Screening Levels										Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>1</sup>	k <sub>e</sub> y	IUR (ug/m <sup>3</sup> -day) <sup>1</sup>	k <sub>e</sub> y	RfD <sub>0</sub> (mg/kg-day)	k <sub>e</sub> y	RfC <sub>1</sub> (mg/m <sup>3</sup> ) <sup>1</sup>	k <sub>e</sub> y	o C	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)		
				1.0E-04	I						1	0.1	Bidrin	141-66-2	6.1E+00	n	6.2E+01	n					1.6E+00	n		3.6E-04			
				9.0E-03	P						1	0.1	Bifenox	42576-02-3	5.5E+02	n	5.5E+03	n					7.5E+01	n		5.7E-01			
				1.5E-02	I						1	0.1	Biphenethrin	82657-04-3	9.2E+02	n	9.2E+03	n					2.3E+02	n		1.1E+03			
8.0E-03	X			5.0E-02	I	4.0E-04	X	V			1		Biphenyl, 1,1'-	92-52-4	5.1E+01	n	2.1E+02	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		8.7E-03			
7.0E-02	H	1.0E-05	H	4.0E-02	I				V		1		Bis(2-chloro-1-methylethyl) ether	108-60-1	4.6E+00	c	2.2E+01	c	2.4E-01	c	1.2E+00	c	3.1E-01	c		1.1E-04			
				3.0E-03	P						1	0.1	Bis(2-chloroethoxy)methane	111-91-1	1.8E+02	n	1.8E+03	n					4.7E+01	n		1.1E-02			
1.1E+00	I	3.3E-04	I						V		1		Bis(2-chloroethyl)ether	111-44-4	2.1E-01	c	1.0E+00	c	7.4E-03	c	3.7E-02	c	1.2E-02	c		3.1E-06			
1.4E-02	I	2.4E-06	C	2.0E-02	I						1	0.1	Bis(2-ethylhexyl)phthalate	117-81-7	3.5E+01	c*	1.2E+02	c	1.0E+00	c	5.1E+00	c	7.1E-02	c*	6.0E+00	1.7E-02	1.4E+00		
2.2E+02	I	6.2E-02	I						V		1		Bis(chloromethyl)ether	542-88-1	7.7E-05	c	3.9E-04	c	3.9E-05	c	2.0E-04	c	6.2E-05	c		1.5E-08			
				5.0E-02	I						1	0.1	Bisphenol A	80-05-7	3.1E+03	n	3.1E+04	n					5.8E+02	n		4.4E+01			
				2.0E-01	I	2.0E-02	H				1		Boron And Borates Only	7440-42-8	1.6E+04	n	2.0E+05	nm	2.1E+01	n	8.8E+01	n	3.1E+03	n		9.9E+00			
7.0E-01	I			4.0E-02	C	1.3E-02	C				1		Boron Trifluoride	7637-07-2	3.1E+03	n	4.1E+04	n	1.4E+01	n	5.7E+01	n	6.2E+02	n					
				4.0E-03	I						1		Bromate	15541-45-4	9.1E-01	c	4.1E+00	c					9.6E-02	c	1.0E+01	7.4E-04	7.7E-02		
2.0E+00	X	6.0E-04	X						V		1	2.4E+03	Bromo-2-chloroethane, 1-	107-04-0	2.4E-02	c	1.2E-01	c	4.1E-03	c	2.0E-02	c	6.5E-03	c		1.8E-06			
				8.0E-03	I	6.0E-02	I	V			1	6.8E+02	Bromobenzene	108-86-1	3.0E+02	n	1.8E+03	ns	6.3E+01	n	2.6E+02	n	5.4E+01	n		3.6E-02			
						4.0E-02	X	V			1	4.0E+03	Bromochloromethane	74-97-5	1.6E+02	n	6.8E+02	n	4.2E+01	n	1.8E+02	n	8.3E-01	n		2.1E-02			
6.2E-02	I	3.7E-05	C	2.0E-02	I				V		1	9.3E+02	Bromodichloromethane	75-27-4	2.7E-01	c	1.4E+00	c	6.6E-02	c	3.3E-01	c	1.2E-01	c	8.0E+01(F)	3.2E-05	2.2E-02		
7.9E-03	I	1.1E-06	I	2.0E-02	I						1	0.1	Bromoform	75-25-2	6.2E+01	c*	2.2E+02	c*	2.2E+00	c	1.1E+01	c	7.9E+00	c*	8.0E+01(F)	2.1E-03	2.1E-02		
				1.4E-03	I	5.0E-03	I	V			1	3.6E+03	Bromomethane	74-83-9	7.3E+00	n	3.2E+01	n	5.2E+00	n	2.2E+01	n	7.0E+00	n		1.8E-03			
				5.0E-03	H						1	0.1	Bromophos	2104-96-3	3.1E+02	n	3.1E+03	n					2.6E+01	n		1.1E-01			
				2.0E-02	I						1	0.1	Bromoxynil	1689-84-5	1.2E+03	n	1.2E+04	n					3.1E+02	n		2.7E-01			
				2.0E-02	I						1	0.1	Bromoxynil Octanoate	1689-99-2	1.2E+03	n	1.2E+04	n					1.0E+02	n		8.7E-01			
3.4E+00	C	3.0E-05	I			2.0E-03	I	V			1	6.7E+02	Butadiene, 1,3-	106-99-0	5.4E-02	c*	2.6E-01	c*	8.1E-02	c*	4.1E-01	c*	1.6E-02	c		8.6E-06			
				1.0E-01	I						1	0.1	Butanol, N-	71-36-3	6.1E+03	n	6.2E+04	n					1.5E+03	n		3.2E-01			
1.9E-03	P			2.0E-01	I						1	0.1	Butyl Benzyl Phthlate	85-68-7	2.6E+02	c*	9.1E+02	c					1.4E+01	c*		2.0E-01			
				2.0E+00	P	3.0E+01	P				1	0.1	Butyl alcohol, sec-	78-92-2	1.2E+05	nm	1.2E+06	nm	3.1E+04	n	1.3E+05	n	3.1E+04	n		6.3E+00			
				5.0E-02	I						1	0.1	Butylate	2008-41-5	3.1E+03	n	3.1E+04	n					3.4E+02	n		3.3E-01			
2.0E-04	C	5.7E-08	C								1	0.1	Butylated hydroxyanisole	25013-16-5	2.4E+03	c	8.6E+03	c	4.3E+01	c	2.2E+02	c	3.4E+02	c		6.3E-01			
				5.0E-02	P				V		1	1.1E+02	Butylbenzene, n-	104-51-8	3.9E+03	ns	5.1E+04	ns					7.8E+02	n		2.5E+00			
				1.0E+00	I						1	0.1	Butylphthalyl Butylglycolate	85-70-1	6.1E+04	n	6.2E+05	nm					1.6E+04	n		3.5E+02			
				2.0E-02	A						1	0.1	Cacodylic Acid	75-60-5	1.2E+03	n	1.2E+04	n					3.1E+02	n					
		1.8E-03	I	1.0E-03	I	2.0E-05	C			0.025	0.001		Cadmium (Diet)	7440-43-9	7.0E+01	n	8.0E+02	n											
		1.8E-03	I	5.0E-04	I	2.0E-05	C			0.05	0.001		Cadmium (Water)	7440-43-9					1.4E-03	c*	6.8E-03	c*	6.9E+00	n	5.0E+00	5.2E-01	3.8E-01		
				5.0E-01	I						1	0.1	Caprolactam	105-60-2	3.1E+04	n	3.1E+05	nm					7.7E+03	n		1.9E+00			
1.5E-01	C	4.3E-05	C	2.0E-03	I						1	0.1	Captafol	2425-06-1	3.2E+00	c*	1.1E+01	c	5.7E-02	c	2.9E-01	c	3.5E-01	c*		6.1E-04			
2.3E-03	C	6.6E-07	C	1.3E-01	I						1	0.1	Captan	133-06-2	2.1E+02	c*	7.5E+02	c	3.7E+00	c	1.9E+01	c	2.7E+01	c*		1.9E-02			
				1.0E-01	I						1	0.1	Carbaryl	63-25-2	6.1E+03	n	6.2E+04	n					1.4E+03	n		1.3E+00			
				5.0E-03	I						1	0.1	Carbofuran	1563-66-2	3.1E+02	n	3.1E+03	n					7.3E+01	n	4.0E+01	2.8E-02	1.6E-02		
				1.0E-01	I	7.0E-01	I	V			1	7.4E+02	Carbon Disulfide	75-15-0	8.2E+02	ns	3.7E+03	ns	7.3E+02	n	3.1E+03	n	7.2E+02	n		2.1E-01			
7.0E-02	I	6.0E-06	I	4.0E-03	I	1.0E-01	I	V			1	4.6E+02	Carbon Tetrachloride	56-23-5	6.1E-01	c	3.0E+00	c	4.1E-01	c	2.0E+00	c	3.9E-01	c	5.0E+00	1.5E-04	1.9E-03		
				1.0E-02	I						1	0.1	Carbosulfan	55285-14-8	6.1E+02	n	6.2E+03	n					1.6E+02	n		3.8E+00			
				1.0E-01	I						1	0.1	Carboxin	5234-68-4	6.1E+03	n	6.2E+04	n					1.5E+03	n		8.0E-01			
						9.0E-04	I				1		Ceric oxide	1306-38-3	1.3E+06	nm	5.4E+06	nm	9.4E-01	n	3.9E+00	n							
				1.0E-01	I						1	0.1	Chloral Hydrate	302-17-0	6.1E+03	n	6.2E+04	n					1.5E+03	n		3.1E-01			
				1.5E-02	I						1	0.1	Chloramben	133-90-4	9.2E+02	n	9.2E+03	n					2.3E+02	n		5.7E-02			
4.0E-01	H										1	0.1	Chloranil	118-75-2	1.2E+00	c	4.3E+00	c					1.7E-01	c		1.4E-04			
3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I				1	0.04	Chlordane	12789-03-6	1.6E+00	c*	6.5E+00	c*	2.4E-02	c*	1.2E								

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																													
Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs		
SFO (mg/kg-day) <sup>-1</sup>	key	IUR (ug/m <sup>3</sup> ) <sup>-1</sup>	key	RfD <sub>o</sub> (mg/kg-day)	key	RfC <sub>i</sub> (mg/m <sup>3</sup> ) <sup>-1</sup>	key	o v o l u t i l e	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)		
				4.0E-02	P			V		1		7.3E+02	Chlorobutane, 1-	109-69-3	3.1E+03	ns	4.1E+04	ns					4.8E+02	n		2.0E-01			
						5.0E+01	I	V		1		1.7E+03	Chlorodifluoromethane	75-45-6	5.3E+04	ns	2.2E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		4.3E+01			
3.1E-02	C	2.3E-05	I	1.0E-02	I	9.8E-02	A	V		1		2.5E+03	Chloroform	67-66-3	2.9E-01	c	1.5E+00	c	1.1E-01	c	5.3E-01	c	1.9E-01	c	8.0E+01(F)	5.3E-05	2.2E-02		
						9.0E-02	I	V		1		1.3E+03	Chloromethane	74-87-3	1.2E+02	n	5.0E+02	n	9.4E+01	n	3.9E+02	n	1.9E+02	n		4.9E-02			
2.4E+00	C	6.9E-04	C					V		1		2.6E+04	Chloromethyl Methyl Ether	107-30-2	1.9E-02	c	9.4E-02	c	3.5E-03	c	1.8E-02	c	5.6E-03	c		1.2E-06			
				8.0E-02	I			V		1		1.8E+02	Chloronaphthalene, Beta-	91-58-7	6.3E+03	ns	8.2E+04	ns					5.5E+02	n		2.9E+00			
3.0E-01	P			3.0E-03	P	1.0E-05	X			1	0.1		Chloronitrobenzene, o-	88-73-3	1.6E+00	c	5.7E+00	c	1.0E-02	n	4.4E-02	n	2.0E-01	c		1.9E-04			
6.3E-03	P			1.0E-03	P	6.0E-04	P			1	0.1		Chloronitrobenzene, p-	100-00-5	6.1E+01	n	2.7E+02	c**	6.3E-01	n	2.6E+00	n	9.4E+00	c**		8.7E-03			
				5.0E-03	I			V		1		2.2E+04	Chlorophenol, 2-	95-57-8	3.9E+02	n	5.1E+03	n					7.1E+01	n		5.7E-02			
						4.0E-04	C	V		1		6.2E+02	Chloropicrin	76-06-2	2.1E+00	n	8.8E+00	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		2.5E-04			
3.1E-03	C	8.9E-07	C	1.5E-02	I					1	0.1		Chlorothalonil	1897-45-6	1.6E+02	c**	5.6E+02	c*	2.7E+00	c	1.4E+01	c	1.9E+01	c*		4.3E-02			
				2.0E-02	I			V		1		9.1E+02	Chlorotoluene, o-	95-49-8	1.6E+03	ns	2.0E+04	ns					1.8E+02	n		1.7E-01			
				2.0E-02	X			V		1		2.5E+02	Chlorotoluene, p-	106-43-4	1.6E+03	ns	2.0E+04	ns					1.9E+02	n		1.8E-01			
2.4E+02	C	6.9E-02	C							1	0.1		Chlorozotocin	54749-90-5	2.0E-03	c	7.2E-03	c	3.5E-05	c	1.8E-04	c	2.8E-04	c		6.2E-08			
				2.0E-01	I					1	0.1		Chlorpropham	101-21-3	1.2E+04	n	1.2E+05	nm					2.2E+03	n		1.9E+00			
				1.0E-03	A					1	0.1		Chlorpyrifos	2921-88-2	6.1E+01	n	6.2E+02	n					6.2E+00	n		9.2E-02			
				1.0E-02	H					1	0.1		Chlorpyrifos Methyl	5598-13-0	6.1E+02	n	6.2E+03	n					8.9E+01	n		4.1E-01			
				5.0E-02	I					1	0.1		Chlorsulfuron	64902-72-3	3.1E+03	n	3.1E+04	n					7.7E+02	n		6.5E-01			
				8.0E-04	H					1	0.1		Chlorthiophos	60238-56-4	4.9E+01	n	4.9E+02	n					2.0E+00	n		5.2E-02			
				1.5E+00	I					0.013			Chromium(III), Insoluble Salts	16065-83-1	1.2E+05	nm	1.5E+06	nm					1.6E+04	n		2.8E+07			
5.0E-01	J	8.4E-02	S	3.0E-03	I	1.0E-04	I		M	0.025			Chromium(VI)	18540-29-9	2.9E-01	c	5.6E+00	c	1.1E-05	c	1.5E-04	c	3.1E-02	c	1.0E+02	5.9E-04	1.8E+05		
										0.013			Chromium, Total	7440-47-3															
				9.0E-03	P	3.0E-04	P	6.0E-06	P		1		Cobalt	7440-48-4	2.3E+01	n	3.0E+02	n	2.7E-04	c*	1.4E-03	c*	4.7E+00	n		2.1E-01			
				6.2E-04	I				M	1	0.1		Coke Oven Emissions	8007-45-2					1.5E-03	c	2.0E-02	c							
				4.0E-02	H					1			Copper	7440-50-8	3.1E+03	n	4.1E+04	n					6.2E+02	n	1.3E+03	2.2E+01	4.6E+01		
				5.0E-02	I	6.0E-01	C			1	0.1		Cresol, m-	108-39-4	3.1E+03	n	3.1E+04	n	6.3E+02	n	2.6E+03	n	7.2E+02	n		5.7E-01			
				5.0E-02	I	6.0E-01	C			1	0.1		Cresol, o-	95-48-7	3.1E+03	n	3.1E+04	n	6.3E+02	n	2.6E+03	n	7.2E+02	n		5.8E-01			
				1.0E-01	A	6.0E-01	C			1	0.1		Cresol, p-	106-44-5	6.1E+03	n	6.2E+04	n	6.3E+02	n	2.6E+03	n	1.4E+03	n		1.1E+00			
				1.0E-01	A					1	0.1		Cresol, p-chloro-m-	59-50-7	6.1E+03	n	6.2E+04	n					1.1E+03	n		1.3E+00			
				1.0E-01	A	6.0E-01	C			1	0.1		Cresols	1319-77-3	6.1E+03	n	6.2E+04	n	6.3E+02	n	2.6E+03	n	1.4E+03	n		1.2E+00			
1.9E+00	H			1.0E-03	P			V		1		1.7E+04	Crotonaldehyde, trans-	123-73-9	3.4E-01	c	1.5E+00	c					3.5E-02	c		7.1E-06			
				1.0E-01	I	4.0E-01	I	V		1		2.7E+02	Cumene	98-82-8	2.1E+03	ns	1.1E+04	ns	4.2E+02	n	1.8E+03	n	3.9E+02	n		6.4E-01			
2.2E-01	C	6.3E-05	C							1	0.1		Cupferron	135-20-6	2.2E+00	c	7.8E+00	c	3.9E-02	c	1.9E-01	c	3.1E-01	c		5.3E-04			
8.4E-01	H			2.0E-03	H					1	0.1		Cyanazine	21725-46-2	5.8E-01	c	2.1E+00	c					7.6E-02	c		3.5E-05			
													Cyanides																
				1.0E-03	I					1			~Calcium Cyanide	592-01-8	7.8E+01	n	1.0E+03	n					1.6E+01	n					
				5.0E-03	I					1			~Copper Cyanide	544-92-3	3.9E+02	n	5.1E+03	n					7.8E+01	n					
				6.0E-04	I			V		1		1.0E+07	~Cyanide (CN-)	57-12-5	4.7E+01	n	6.1E+02	n					9.3E+00	n	2.0E+02	9.4E-02	2.0E+00		
				1.0E-03	I			V		1			~Cyanogen	460-19-5	7.8E+01	n	1.0E+03	n					1.6E+01	n					
				9.0E-02	I			V		1			~Cyanogen Bromide	506-68-3	7.0E+03	n	9.2E+04	n					1.4E+03	n					
				5.0E-02	I			V		1			~Cyanogen Chloride	506-77-4	3.9E+03	n	5.1E+04	n					7.8E+02	n					
				6.0E-04	I	8.0E-04	I	V		1			~Hydrogen Cyanide	74-90-8	4.7E+01	n	6.1E+02	n	8.3E-01	n	3.5E+00	n	1.4E+00	n					
				2.0E-03	I					1			~Potassium Cyanide	151-50-8	1.6E+02	n	2.0E+03	n					3.1E+01	n					
				5.0E-03	I					0.04			~Potassium Silver Cyanide	506-61-6	3.9E+02	n	5.1E+03	n					5.9E+01	n					
				1.0E-01	I					0.04			~Silver Cyanide	506-64-9	7.8E+03	n	1.0E+05	nm					1.3E+03	n					
				1.0E-03	I					1			~Sodium Cyanide	143-33-9	7.8E+01	n	1.0E+03	n					1.6E+01	n	2.0E+02				
				2.0E-04	P			V		1		4.6E+03	~Thiocyanate	463-56-9	1.6E+01	n	2.0E+02	n					3.1E+00	n		6.6E-04			
				5.0E-02	I					1			~Zinc Cyanide	557-21-1	3.9E+03	n	5.1E+04	n					7.8E+02	n					
						6.0E+00	I	V		1		1.2E+02	Cyclohexane	110-82-7	7.0E+03	ns	2.9E+04	ns	6.3E+03	n	2.6E+04	n	1.3E+04	n</					

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																											
Toxicity and Chemical-specific Information													Contaminant		Screening Levels											Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>-1</sup>	key	IUR (ug/m <sup>3</sup> ) <sup>-1</sup>	key	RfD <sub>o</sub> (mg/kg-day)	key	RfC <sub>1</sub> (mg/m <sup>3</sup> )	key	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)	
8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	1	9.8E+02	Dibromo-3-chloropropane, 1,2-	96-12-8	5.4E-03	c	6.9E-02	c	1.6E-04	c	2.0E-03	c	3.2E-04	c	2.0E-01	1.4E-07	8.6E-05	
8.4E-02	I	2.7E-05	C	2.0E-02	I		V		1	0.1	8.0E+02	Dibromobenzene, 1,4-	106-37-6	6.1E+02	n	6.2E+03	n					9.8E+01	n		9.3E-02		
												Dibromochloromethane	124-48-1	6.8E-01	c	3.3E+00	c	9.0E-02	c	4.5E-01	c	1.5E-01	c	8.0E+01(F)	3.9E-05	2.1E-02	
2.0E+00	I	6.0E-04	I	9.0E-03	I	9.0E-03	I	V	1		1.3E+03	Dibromoethane, 1,2-	106-93-4	3.4E-02	c	1.7E-01	c	4.1E-03	c	2.0E-02	c	6.5E-03	c	5.0E-02	1.8E-06	1.4E-05	
												Dibromomethane (Methylene Bromide)	74-95-3	2.5E+01	n	1.1E+02	n	4.2E+00	n	1.8E+01	n	7.9E+00	n		1.9E-03		
												Dibutyl Phthalate	84-74-2	6.1E+03	n	6.2E+04	n				6.7E+02	n		1.7E+00			
				3.0E-04	P		I		1	0.1		Dibutyltin Compounds	NA	1.8E+01	n	1.8E+02	n					4.7E+00	n				
												Dicamba	1918-00-9	1.8E+03	n	1.8E+04	n				4.4E+02	n		1.1E-01			
4.2E-03	P								1		5.2E+02	Dichloro-2-butene, 1,4-	764-41-0	6.9E-03	c	3.5E-02	c	5.8E-04	c	2.9E-03	c	1.2E-03	c		5.4E-07		
	4.2E-03	P							1	0.1	5.2E+02	Dichloro-2-butene, cis-1,4-	1476-11-5	6.9E-03	c	3.5E-02	c	5.8E-04	c	2.9E-03	c	1.2E-03	c		5.4E-07		
												Dichloro-2-butene, trans-1,4-	110-57-6	6.9E-03	c	3.5E-02	c	5.8E-04	c	2.9E-03	c	1.2E-03	c		5.4E-07		
5.0E-02	I			4.0E-03	I				1	0.1	7.6E+02	Dichloroacetic Acid	79-43-6	9.7E+00	c*	3.4E+01	c*					1.3E+00	c*	6.0E+01	2.7E-04	1.2E-02	
5.4E-03	C	1.1E-05	C	7.0E-02	A	8.0E-01	I	V	1		3.8E+02	Dichlorobenzene, 1,2-	95-50-1	1.9E+03	ns	9.8E+03	ns	2.1E+02	n	8.8E+02	n	2.8E+02	n	6.0E+02	2.7E-01	5.8E-01	
												Dichlorobenzene, 1,4-	106-46-7	2.4E+00	c	1.2E+01	c	2.2E-01	c	1.1E+00	c	4.2E-01	c	7.5E+01	4.0E-04	7.2E-02	
												Dichlorobenzidine, 3,3'-	91-94-1	1.1E+00	c	3.8E+00	c	7.2E-03	c	3.6E-02	c	1.1E-01	c		7.1E-04		
4.5E-01	I	3.4E-04	C						1	0.1		Dichlorobenzophenone, 4,4'-	90-98-2	5.5E+02	n	5.5E+03	n					1.4E+02	n		8.5E-01		
												Dichlorodifluoromethane	75-71-8	9.4E+01	n	4.0E+02	n	1.0E+02	n	4.4E+02	n	1.9E+02	n		3.0E-01		
5.7E-03	C	1.6E-06	C	2.0E-01	P				1		1.7E+03	Dichloroethane, 1,1-	75-34-3	3.3E+00	c	1.7E+01	c	1.5E+00	c	7.7E+00	c	2.4E+00	c		6.8E-04		
9.1E-02	I	2.6E-05	I	6.0E-03	X	7.0E-03	P	V	1		3.0E+03	Dichloroethane, 1,2-	107-06-2	4.3E-01	c*	2.2E+00	c*	9.4E-02	c*	4.7E-01	c*	1.5E-01	c*	5.0E+00	4.2E-05	1.4E-03	
												Dichloroethylene, 1,1-	75-35-4	2.4E+02	n	1.1E+03	n	2.1E+02	n	8.8E+02	n	2.6E+02	n	7.0E+00	9.3E-02	2.5E-03	
												Dichloroethylene, 1,2- (Mixed Isomers)	540-59-0	7.0E+02	n	9.2E+03	ns				1.3E+02	n		3.7E-02			
				2.0E-03	I	V			1		2.4E+03	Dichloroethylene, 1,2-cis-	156-59-2	1.6E+02	n	2.0E+03	n					2.8E+01	n	7.0E+01	8.2E-03	2.1E-02	
												Dichloroethylene, 1,2-trans-	156-60-5	1.5E+02	n	6.9E+02	n	6.3E+01	n	2.6E+02	n	8.6E+01	n	1.0E+02	2.5E-02	2.9E-02	
												Dichlorophenol, 2,4-	120-83-2	1.8E+02	n	1.8E+03	n				3.5E+01	n		4.1E-02			
3.6E-02	C	1.0E-05	C	9.0E-02	A	4.0E-03	I	V	1		1.4E+03	Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	6.9E+02	n	7.7E+03	n					1.3E+02	n	7.0E+01	3.5E-02	1.8E-02	
												Dichlorophenoxy)butyric Acid, 4-(2,4-	94-82-6	4.9E+02	n	4.9E+03	n				9.1E+01	n		3.6E-02			
												Dichloropropane, 1,2-	78-87-5	9.4E-01	c*	4.7E+00	c*	2.4E-01	c*	1.2E+00	c*	3.8E-01	c*	5.0E+00	1.3E-04	1.7E-03	
				2.0E-02	P		V		1		1.5E+03	Dichloropropane, 1,3-	142-28-9	1.6E+03	ns	2.0E+04	ns					2.9E+02	n		9.9E-02		
												Dichloropropanol, 2,3-	616-23-9	1.8E+02	n	1.8E+03	n				4.7E+01	n		9.9E-03			
												Dichloropropene, 1,3-	542-75-6	1.7E+00	c*	8.3E+00	c*	6.1E-01	c*	3.1E+00	c*	4.1E-01	c*		1.5E-04		
2.9E-01	I	8.3E-05	C	5.0E-04	I	5.0E-04	I		1	0.1		Dichlorvos	62-73-7	1.7E+00	c*	5.9E+00	c*	2.9E-02	c*	1.5E-01	c*	2.3E-01	c*		7.0E-05		
				8.0E-03	P	7.0E-03	P	V	1		1.3E+02	Dicyclopentadiene	77-73-6	3.1E+01	n	1.3E+02	ns	7.3E+00	n	3.1E+01	n	1.2E+01	n		4.3E-02		
												Dieldrin	60-57-1	3.0E-02	c	1.1E-01	c	5.3E-04	c	2.7E-03	c	1.5E-03	c		6.1E-05		
	3.0E-04	C				5.0E-03	I		1	0.1		Diesel Engine Exhaust	NA					8.1E-03	c	4.1E-02	c						
												Diethanolamine	111-42-2	4.3E+06	nm	1.8E+07	nm	3.1E+00	n	1.3E+01	n				4.7E+00		
				8.0E-01	I				1		0.1	Diethyl Phthalate	84-66-2	4.9E+04	n	4.9E+05	nm					1.1E+04	n				
				3.0E-02	P	1.0E-04	P		1	0.1		Diethylene Glycol Monobutyl Ether	112-34-5	1.8E+03	n	1.8E+04	n	1.0E-01	n	4.4E-01	n	4.7E+02	n		1.0E-01		
												Diethylene Glycol Monoethyl Ether	111-90-0	3.6E+03	n	3.6E+04	n	3.1E-01	n	1.3E+00	n	9.4E+02	n		1.9E-01		
												Diethylformamide	617-84-5	6.1E+01	n	6.2E+02	n				1.6E+01	n		3.2E-03			
3.5E+02	C	1.0E-01	C						1	0.1		Diethylstilbestrol	56-53-1	1.4E-03	c	4.9E-03	c	2.4E-05	c	1.2E-04	c	4.3E-05	c		2.4E-05		
												Difenzoquat	43222-48-6	4.9E+03	n	4.9E+04	n				1.2E+03	n					
												Diflubenzuron	35367-38-5	1.2E+03	n	1.2E+04	n				2.2E+02	n		2.5E-01			
4.4E-02	C	1.3E-05	C			4.0E+01	I	V	1		1.4E+03	Difluoroethane, 1,1-	75-37-6	5.2E+04	ns	2.2E+05	nms	4.2E+04	n	1.8E+05	n	8.3E+04	n		2.8E+01		
												Dihydrosafrole	94-58-6	2.4E-01	c	1.2E+00	c	1.9E-01	c	9.4E-01	c	3.0E-01	c		3.7E-04		
												Diisopropyl Ether	108-20-3	2.4E+03	ns	1.0E+04	ns	7.3E+02	n	3.1E+03	n	1.5E+03	n		3.7E-01		
				8.0E-02	I		V		1		5.3E+02	Diisopropyl Methylphosphonate	1445-75-6	6.3E+03	ns	8.2E+04	ns					1.2E+03	n		3.5E-01		
												Dimethipin	55290-64-7	1.2E+03	n	1.2E+04	n				3.1E+02	n		6.9E-02			
												Dimethoate	60-51-5	1.2E+01	n	1.2E+02	n				3.1E+00	n		7.0E-04			
1.4E-02	H								1	0.1		Dimethoxybenzidine, 3,3'-	119-90-4	3.5E+01	c	1.2E+02	c					4.7E+00	c		5.7E-03		
1.7E-03	P			6.0E-02	P				1	0.1		Dimethyl methylphosphonate	756-79-6	2.9E+02	c*	1.0E+03	c*					3.9E+01	c*		8.3E-03		
4.6E+00	C	1.3E-03	C						1	0.1		Dimethylamino azobenzene [p-]	60-11-7	1.1E-01	c	3.7E-01	c	1.9E-03	c	9.4E-03	c	4.3E-03	c		1.8E-05		
5.8E-01	H								1	0.1		Dimethylaniline HCl, 2,4-	21436-96-4	8.4E-01	c	3.0E+00	c					1.1E-01	c		6.2E-05		
2.0E-01																											

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																													
Toxicity and Chemical-specific Information													Contaminant					Screening Levels										Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>1</sup>	k <sub>e</sub> y	IUR (ug/m <sup>3</sup> -day) <sup>1</sup>	k <sub>e</sub> y	RfD <sub>0</sub> (mg/kg-day)	k <sub>e</sub> y	RfC <sub>1</sub> (mg/m <sup>3</sup> )	k <sub>e</sub> y	v <sub>o</sub> c	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)		
				1.0E-04	P						1	0.1	Dinitrobenzene, 1,2-	528-29-0	6.1E+00	n	6.2E+01	n					1.5E+00	n		1.4E-03			
				1.0E-04	I						1	0.1	Dinitrobenzene, 1,3-	99-65-0	6.1E+00	n	6.2E+01	n					1.5E+00	n		1.4E-03			
				1.0E-04	P						1	0.1	Dinitrobenzene, 1,4-	100-25-4	6.1E+00	n	6.2E+01	n					1.5E+00	n		1.4E-03			
				2.0E-03	I						1	0.1	Dinitrophenol, 2,4-	51-28-5	1.2E+02	n	1.2E+03	n					3.0E+01	n		3.4E-02			
6.8E-01	I										1	0.1	Dinitrotoluene Mixture, 2,4/2,6-	25321-14-6	7.2E-01	c	2.5E+00	c					9.2E-02	c		1.3E-04			
3.1E-01	C	8.9E-05	C	2.0E-03	I						1	0.102	Dinitrotoluene, 2,4-	121-14-2	1.6E+00	c*	5.5E+00	c	2.7E-02	c	1.4E-01	c	2.0E-01	c		2.8E-04			
				1.0E-03	P						1	0.099	Dinitrotoluene, 2,6-	606-20-2	6.1E+01	n	6.2E+02	n					1.5E+01	n		2.0E-02			
				2.0E-03	S						1	0.006	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	1.5E+02	n	2.0E+03	n					3.0E+01	n		2.3E-02			
				2.0E-03	S						1	0.009	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	1.5E+02	n	1.9E+03	n					3.0E+01	n		2.3E-02			
				1.0E-03	I						1	0.1	Dinoseb	88-85-7	6.1E+01	n	6.2E+02	n					1.1E+01	n	7.0E+00	9.8E-02	6.2E-02		
1.0E-01	I	7.7E-06	C	3.0E-02	I	3.0E+00	C				1	0.1	Dioxane, 1,4-	123-91-1	4.9E+00	c	1.7E+01	c	3.2E-01	c	1.6E+00	c	6.7E-01	c		1.4E-04			
6.2E+03	I	1.3E+00	I								1	0.03	Dioxins ~Hexachlorodibenzo-p-dioxin, Mixture	NA	9.4E-05	c	3.9E-04	c	1.9E-06	c	9.4E-06	c	1.1E-05	c		1.5E-05			
1.3E+05	C	3.8E+01	C	7.0E-10	I	4.0E-08	C				1	0.03	~TCDD, 2,3,7,8-	1746-01-6	4.5E-06	c*	1.8E-05	c*	6.4E-08	c	3.2E-07	c	5.2E-07	c*	3.0E-05	2.6E-07	1.5E-05		
				3.0E-02	I						1	0.1	Diphenamid	957-51-7	1.8E+03	n	1.8E+04	n					4.7E+02	n		4.6E+00			
				8.0E-04	X						1	0.1	Diphenyl Sulfone	127-63-9	4.9E+01	n	4.9E+02	n					1.1E+01	n		2.8E-02			
8.0E-01	I	2.2E-04	I	2.5E-02	I						1	0.1	Diphenylamine	122-39-4	1.5E+03	n	1.5E+04	n					2.4E+02	n		4.4E-01			
				2.2E-03	I						1	0.1	Diphenylhydrazine, 1,2-	122-66-7	6.1E-01	c	2.2E+00	c	1.1E-02	c	5.6E-02	c	6.7E-02	c		2.2E-04			
											1	0.1	Diquat	85-00-7	1.3E+02	n	1.4E+03	n					3.4E+01	n	2.0E+01	6.5E-01	3.7E-01		
7.4E+00	C	2.1E-03	C								1	0.1	Direct Black 38	1937-37-7	6.6E-02	c	2.3E-01	c	1.2E-03	c	5.8E-03	c	9.1E-03	c		4.4E+00			
7.4E+00	C	2.1E-03	C								1	0.1	Direct Blue 6	2602-46-2	6.6E-02	c	2.3E-01	c	1.2E-03	c	5.8E-03	c	9.1E-03	c		1.4E+01			
6.7E+00	C	1.9E-03	C								1	0.1	Direct Brown 95	16071-86-6	7.3E-02	c	2.6E-01	c	1.3E-03	c	6.5E-03	c	1.0E-02	c					
				4.0E-05	I						1	0.1	Disulfoton	298-04-4	2.4E+00	n	2.5E+01	n					3.8E-01	n		7.1E-04			
				1.0E-02	I			V			1	0.1	Diithiane, 1,4-	505-29-3	6.1E+02	n	6.2E+03	ns					1.5E+02	n		7.6E-02			
				2.0E-03	I						1	0.1	Diuron	330-54-1	1.2E+02	n	1.2E+03	n					2.8E+01	n		1.2E-02			
				4.0E-03	I						1	0.1	Dodine	2439-10-3	2.4E+02	n	2.5E+03	n					6.2E+01	n		3.2E-01			
				2.5E-02	I			V			1	4.1E+02	EPTC	759-94-4	2.0E+03	ns	2.6E+04	ns					2.9E+02	n		1.5E-01			
				6.0E-03	I						1	0.1	Endosulfan	115-29-7	3.7E+02	n	3.7E+03	n					7.8E+01	n		1.1E+00			
				2.0E-02	I						1	0.1	Endothall	145-73-3	1.2E+03	n	1.2E+04	n					3.0E+02	n	1.0E+02	7.1E-02	2.4E-02		
				3.0E-04	I						1	0.1	Endrin	72-20-8	1.8E+01	n	1.8E+02	n					1.7E+00	n	2.0E+00	6.8E-02	8.1E-02		
9.9E-03	I	1.2E-06	I	6.0E-03	P	1.0E-03	I	V			1	1.1E+04	Epichlorohydrin	106-89-8	2.0E+01	n	8.8E+01	n	1.0E+00	n	4.4E+00	n	2.0E+00	n		4.5E-04			
				2.0E-02	I	V					1	1.5E+04	Epoxycyclobutane, 1,2-	106-88-7	1.7E+02	n	7.2E+02	n	2.1E+01	n	8.8E+01	n	4.2E+01	n		9.2E-03			
				5.0E-03	I						1	0.1	Ethephon	16672-87-0	3.1E+02	n	3.1E+03	n					7.8E+01	n		1.6E-02			
				5.0E-04	I						1	0.1	Ethion	563-12-2	3.1E+01	n	3.1E+02	n					3.2E+00	n		6.3E-03			
				1.0E-01	P	6.0E-02	P				1	0.1	Ethoxyethanol Acetate, 2-	111-15-9	6.1E+03	n	6.2E+04	n	6.3E+01	n	2.6E+02	n	1.5E+03	n		3.2E-01			
				4.0E-01	H	2.0E-01	I				1	0.1	Ethoxyethanol, 2-	110-80-5	2.4E+04	n	2.5E+05	nm	2.1E+02	n	8.8E+02	n	6.2E+03	n		1.3E+00			
				9.0E-01	I		V				1	1.1E+04	Ethyl Acetate	141-78-6	7.0E+04	ns	9.2E+05	nms					1.4E+04	n		2.9E+00			
4.8E-02	H						V				1	2.5E+03	Ethyl Acrylate	140-88-5	1.3E+01	c	6.0E+01	c					1.4E+00	c		3.0E-04			
							I	V			1	2.1E+03	Ethyl Chloride	75-00-3	1.5E+04	ns	6.1E+04	ns	1.0E+04	n	4.4E+04	n	2.1E+04	n		5.9E+00			
				2.0E-01	I		V				1	1.0E+04	Ethyl Ether	60-29-7	1.6E+04	ns	2.0E+05	nms					3.1E+03	n		6.8E-01			
				9.0E-02	H	3.0E-01	P	V			1	1.1E+03	Ethyl Methacrylate	97-63-2	1.5E+03	ns	7.5E+03	ns	3.1E+02	n	1.3E+03	n	4.2E+02	n		9.9E-02			
				1.0E-05	I						1	0.1	Ethyl-p-nitrophenyl Phosphonate	2104-64-5	6.1E-01	n	6.2E+00	n					6.6E-02	n		2.1E-03			
1.1E-02	C	2.5E-06	C	1.0E-01	I	1.0E+00	I	V			1	4.8E+02	Ethylbenzene	100-41-4	5.4E+00	c	2.7E+01	c	9.7E-01	c	4.9E+00	c	1.3E+00	c	7.0E+02	1.5E-03	7.8E-01		
				3.0E-02	P						1	0.1	Ethylene Cyanohydrin	109-78-4	1.8E+03	n	1.8E+04	n					4.7E+02	n		9.5E-02			
				9.0E-02	P						1	0.1	Ethylene Diamine	107-15-3	5.5E+03	n	5.5E+04	n					1.4E+03	n		3.2E-01			
				2.0E+00	I	4.0E-01	C				1	0.1	Ethylene Glycol	107-21-1	1.2E+05	nm	1.2E+06	nm	4.2E+02	n	1.8E+03	n	3.1E+04	n		6.3E+00			
				1.0E-01	I	1.6E+00	I				1	0.1	Ethylene Glycol Monobutyl Ether	111-76-2	6.1E+03	n	6.2E+04	n	1.7E+03	n	7.0E+03	n	1.5E+03	n		3.2E-01			
3.1E-01	C	8.8E-05	C			3.0E-02	C	V			1	1.2E+05	Ethylene Oxide	75-21-8	1.7E-01	c	8.3E-01	c	2.8E-02	c	1.4E-01	c	4.4E-02	c		9.1E-06			
4.5E-02	C	1.3E-05	C	8.0E-05	I																								

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																											
Toxicity and Chemical-specific Information												Contaminant				Screening Levels										Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>1</sup>	k y	IUR (ug/m <sup>3</sup> ) <sup>1</sup>	k y	RfD <sub>o</sub> (mg/kg-day)	k y	RfC <sub>1</sub> (mg/m <sup>3</sup> ) <sup>1</sup>	k y	o muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)	
				9.0E-01 3.0E+00	P	3.0E-04	X		1	0.1		Formic Acid Fosetyl-AL	64-18-6 39148-24-8	4.9E+04 1.8E+05	n nm	4.2E+05 1.8E+06	nm nm	3.1E-01 n	n	1.3E+00	n	1.4E+04 4.7E+04	n n		2.8E+00		
				1.0E-03 1.0E-03	X		V		1		1.7E+02 6.2E+03	Furans ~Dibenzofuran ~Furan	132-64-9 110-00-9	7.8E+01 7.8E+01	n n	1.0E+03 1.0E+03	ns n					5.8E+00 1.5E+01	n n		1.1E-01 5.7E-03		
3.8E+00	H			9.0E-01 3.0E-03	I	2.0E+00	I	V	1	0.1	1.7E+05	~Tetrahydrofuran Furazolidone Furfural	109-99-9 67-45-8 98-01-1	1.8E+04 1.3E-01 1.8E+02	n c n	9.5E+04 4.5E-01 1.8E+03	n c n	2.1E+03 n	n	8.8E+03	n	3.2E+03 1.8E-02 4.6E+01	n c n		7.1E-01 3.4E-05 9.9E-03		
1.5E+00 3.0E-02	C	4.3E-04 8.6E-06	C						1	0.1		Furium Furmecyclox Glufosinate, Ammonium	531-82-8 60568-05-0 77182-82-2	3.2E-01 1.6E+01 2.4E+01	c c n	1.1E+00 5.7E+01 2.5E+02	c c n	5.7E-03 2.8E-01 n	c	2.9E-02 1.4E+00	c	4.4E-02 9.6E-01 6.3E+00	c c n		5.9E-05 1.0E-03 1.4E-03		
				4.0E-04	I				1	0.1		Glutaraldehyde Glycidyl Glyphosate	111-30-8 765-34-4 1071-83-6	1.1E+05 2.4E+01 6.1E+03	nm n n	4.8E+05 2.5E+02 6.2E+04	nm n n	8.3E-02 1.0E+00	n	3.5E-01 4.4E+00	n	6.3E+00 1.6E+03	n	7.0E+02	1.3E-03 3.2E-01	1.4E-01	
				3.0E-03 3.0E-03 5.0E-05	I				1	0.1		Goal Guthion Haloxypop, Methyl	42874-03-3 86-50-0 69806-40-2	1.8E+02 1.8E+02 3.1E+00	n n n	1.8E+03 1.8E+03 3.1E+01	n n n	1.0E+01	n	4.4E+01	n	2.4E+01 4.3E+01 5.8E-01	n n n		1.9E+00 1.3E-02 6.4E-03		
4.5E+00 9.1E+00	I	1.3E-03 2.6E-03	I	1.3E-02 5.0E-04 1.3E-05	I				1	0.1		Harmony Heptachlor Heptachlor Epoxide	79277-27-3 76-44-8 1024-57-3	7.9E+02 1.1E-01 5.3E-02	n c c*	8.0E+03 3.8E-01 1.9E-01	n c c*	1.9E-03 c	c	9.4E-03 c	c	1.8E-03 3.3E-03	c c*	4.0E-01 2.0E-01	6.1E-02 1.4E-04 6.8E-05	3.3E-02 4.1E-03	
1.6E+00	I	4.6E-04	I	2.0E-03 2.0E-04 8.0E-04	I				1	0.1		Hexabromobenzene Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153) Hexachlorobenzene	87-82-1 68631-49-2 118-74-1	1.2E+02 1.2E+01 3.0E-01	n n c	1.2E+03 1.2E+02 1.1E+00	n n c	5.3E-03 c	c	2.7E-02	c	4.2E-02	c	1.0E+00	1.8E-01 3.1E+00 5.3E-04	1.3E-02	
7.8E-02 6.3E+00 1.8E+00	I	2.2E-05 1.8E-03 5.3E-04	I	1.0E-03 8.0E-03 A	P				1	0.1		Hexachlorobutadiene Hexachlorocyclohexane, Alpha- Hexachlorocyclohexane, Beta-	87-68-3 319-84-6 319-85-7	6.2E+00 7.7E-02 2.7E-01	c** c c	2.2E+01 2.7E-01 9.6E-01	c* c c	1.1E-01 c	c	5.6E-01 6.8E-03 2.3E-02	c	2.6E-01 6.2E-03 2.2E-02	c* c c		5.0E-04 3.6E-05 1.3E-04		
1.1E+00 1.8E+00	C	3.1E-04 5.1E-04	C	3.0E-04 I					1	0.04		Hexachlorocyclohexane, Gamma- (Lindane) Hexachlorocyclohexane, Technical Hexachlorocyclopentadiene	58-89-9 608-73-1 77-47-4	5.2E-01 2.7E-01 3.7E+02	c* c n	2.1E+00 9.6E-01 3.7E+03	c c n	7.8E-03 4.8E-03 2.1E-01	c	4.0E-02 2.4E-02 8.8E-01	c	3.6E-02 2.2E-02 2.2E+01	c* c n	2.0E-01 5.0E+01	2.1E-04 1.3E-04 7.0E-02	1.2E-03 1.6E-01	
4.0E-02 1.1E-01	I	1.1E-05	C	7.0E-04 3.0E-04 3.0E-03	I	3.0E-02 I			1	0.1		Hexachloroethane Hexachlorophene Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	67-72-1 70-30-4 121-82-4	1.2E+01 1.8E+01 5.6E+00	c** n c*	4.3E+01 1.8E+02 2.4E+01	c* n c	2.2E-01	c	1.1E+00	c	7.9E-01 4.7E+00 6.1E-01	c** n c*		4.8E-04 6.3E+00 2.3E-04		
				4.0E-04 6.0E-02	P H	1.0E-05 7.0E-01	I	V	1	0.1	5.2E+03 1.4E+02	Hexamethylene Diisocyanate, 1,6- Hexamethylphosphoramide Hexane, N-	822-06-0 680-31-9 110-54-3	3.4E+00 2.4E+01 5.7E+02	n n ns	1.4E+01 2.5E+02 2.6E+03	n n ns	1.0E-02 n	n	4.4E-02	n	2.1E-02 6.2E+00 2.5E+02	n n n		2.1E-04 1.4E-03 1.8E+00		
				2.0E+00 5.0E-03 3.3E-02	P I	3.0E-02 I	V		1	0.1	3.3E+03	Hexanedioic Acid Hexanone, 2- Hexazinone	124-04-9 591-78-6 51235-04-2	1.2E+05 2.1E+02 2.0E+03	nm n c	1.2E+06 1.4E+03 2.0E+04	nm n n	3.1E+01 n	n	1.3E+02	n	3.1E+04 3.4E+01 5.0E+02	n n n		7.7E+00 7.9E-03 2.3E-01		
3.0E+00 3.0E+00	I	4.9E-03 I		3.0E-05 I	P				1			Hydrazine Hydrazine Sulfate Hydrogen Chloride	302-01-2 10034-93-2 7647-01-0	2.1E-01 2.1E-01 2.8E+07	c c nm	9.5E-01 9.5E-01 1.2E+08	c c nm	5.0E-04 c	c*	2.5E-03 c	c*	2.2E-02 c	c				
6.0E-02	P			4.0E-02 4.0E-02	C P	1.4E-02 2.0E-03	C I		1		1	Hydrogen Fluoride Hydrogen Sulfide Hydroquinone	7664-39-3 7783-06-4 123-31-9	3.1E+03 2.8E+06 8.1E+00	n nm c	4.1E+04 1.2E+07 2.9E+01	n nm c	1.5E+01 2.1E+00	n	6.1E+01 8.8E+00	n	6.2E+02 n 1.1E+00	n n c		7.5E-04		
				1.3E-02 2.5E-01 1.0E-02	I I A				1	0.1		Imazalil Imazaquin Iodine	35554-44-0 81335-37-7 7553-56-2	7.9E+02 1.5E+04 7.8E+02	n n n	8.0E+03 1.5E+05 1.0E+04	n nm n					1.4E+02 3.8E+03 1.6E+02	n n n		2.5E+00 1.9E+01 9.4E+00		
				4.0E-02 7.0E-01 3.0E-01	I P I				1	0.1		Iprodione Iron Isobutyl Alcohol	36734-19-7 7439-89-6 78-83-1	2.4E+03 5.5E+04 1.8E+04	n n n	2.5E+04 7.2E+05 1.8E+05	n nm nm					5.7E+02 1.1E+04 4.6E+03	n n n		1.7E-01 2.7E+02 9.5E-01		
9.5E-04	I			2.0E-01 1.5E-02	I	2.0E+00 I	C		1	0.1		Isophorone Isopropalin Isopropanol	78-59-1 33820-53-0 67-63-0	5.1E+02 9.2E+02 9.9E+09	c* n nm	1.8E+03 9.2E+03 4.2E+10	c* n nm	2.1E+03 n	n	8.8E+03	n	6.7E+01 2.3E+02	c* n		2.2E-02 5.4E+00		
				1.0E-01 5.0E-02	I I				1	0.1		Isopropyl Methyl Phosphonic Acid Isoxaben JP-7	1832-54-8 82558-50-7 NA	6.1E+03 3.1E+03 4.3E+08	n n nm	6.2E+04 3.1E+04 1.8E+09	n n nm	3.1E+02 n	n	1.3E+03	n	1.6E+03 5.6E+02 6.3E+02	n n n		3.4E-01 1.5E+00		
				7.5E-02 2.0E-03	I I				1	0.1		Kerb Lactofen Lead Compounds	23950-58-5 77501-63-4	4.6E+03 1.2E+02	n n	4.6E+04 1.2E+03	n n					9.0E+02 1.9E+01	n n		9.1E-01 8.7E-01		
2.8E-01 3.8E-02	C	8.0E-05 C							1	0.1		~Lead acetate ~Lead and Compounds ~Lead subacetate	301-04-2 7439-92-1 1335-32-6	1.7E+00 4.0E+02 1.3E+01	c L c	6.2E+00 8.0E+02 4.5E+01	c L c	3.0E-02 1.5E-01 2.2E-01	c L c	1.5E-01 n	c	2.4E-01 L 1.8E+00	c L c	1.5E+01		1.4E+01	
				1.0E-07 2.0E-03 2.0E-03	I I P				1	0.1		~Tetraethyl Lead linuron Lithium	78-00-2 330-55-2 7439-93-2	6.1E-03 1.2E+02 1.6E+02	n n n	6.2E-02 1.2E+03 2.0E+03	n n n					9.9E-04 2.6E+01 3.1E+01	n n n		3.5E-06 2.3E-02 9.3E+00		



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Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs		
SFO (mg/kg-day) <sup>-1</sup>	k <sub>e</sub> y	IUR (ug/m <sup>3</sup> ) <sup>-1</sup>	k <sub>e</sub> y	RfD <sub>o</sub> (mg/kg-day)	k <sub>e</sub> y	RfC <sub>1</sub> (mg/m <sup>3</sup> )	k <sub>e</sub> y	v <sub>1</sub> c	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)		
				3.0E-04	X						1	0.1	N,N'-Diphenyl-1,4-benzenediamine	74-31-7	1.8E+01	n	1.8E+02	n					2.7E+00	n		2.8E-01			
				2.0E-03	I						1	0.1	Naled	300-76-5	1.2E+02	n	1.2E+03	n					3.1E+01	n		1.4E-02			
1.8E+00	C	0.0E+00	C	3.0E-02	X	1.0E-01	P	V			1	0.1	Naphtha, High Flash Aromatic (HFAN)	64724-95-6	2.3E+03	n	3.1E+04	n	1.0E+02	n	4.4E+02	n	1.4E+02	n		1.7E-04			
											1	0.1	Naphthylamine, 2-	91-59-8	2.7E-01	c	9.6E-01	c					3.3E-02	c					
				1.0E-01	I						1	0.1	Napropamide	15299-99-7	6.1E+03	n	6.2E+04	n					1.3E+03	n		8.3E+00			
				5.0E-02	C	5.0E-05	C				0.04		Nickel Carbonyl	13463-39-3	3.7E+03	n	4.4E+04	n	5.2E-02	n	2.2E-01	n	6.7E+02	n					
				5.0E-02	C	1.0E-04	C				1		Nickel Oxide	1313-99-1	3.8E+03	n	4.7E+04	n	1.0E-01	n	4.4E-01	n	7.8E+02	n					
		2.4E-04	I	5.0E-02	C	5.0E-05	C				0.04		Nickel Refinery Dust	NA	3.7E+03	n	4.4E+04	n	1.0E-02	c**	5.1E-02	c**	7.6E+02	n		1.1E+02			
1.7E+00	C	2.6E-04	C	2.0E-02	I	9.0E-05	A				0.04		Nickel Soluble Salts	7440-02-0	1.5E+03	n	2.0E+04	n	9.4E-03	c*	4.7E-02	c**	3.0E+02	n		2.0E+01			
		4.8E-04	I	5.0E-02	C	5.0E-05	C				0.04		Nickel Subulfide	12035-72-2	3.8E-01	c	1.7E+00	c	5.1E-03	c*	2.6E-02	c**	3.9E-02	c					
				1.6E+00	I						1		Nitrate	14797-55-8	1.3E+05	nm	1.6E+06	nm					2.5E+04	n	1.0E+04				
				1.0E-01	I						1		Nitrite	14797-65-0	7.8E+03	n	1.0E+05	nm					1.6E+03	n	1.0E+03				
				1.0E-02	X	5.0E-05	X				1	0.1	Nitroaniline, 2-	88-74-4	6.1E+02	n	6.0E+03	n	5.2E-02	n	2.2E-01	n	1.5E+02	n		6.2E-02			
2.0E-02	P			4.0E-03	P	6.0E-03	P				1	0.1	Nitroaniline, 4-	100-01-6	2.4E+01	c*	8.6E+01	c*	6.3E+00	n	2.6E+01	n	3.3E+00	c*		1.4E-03			
		4.0E-05	I	2.0E-03	I	9.0E-03	I	V			1		Nitrobenzene	98-95-3	4.8E+00	c*	2.4E+01	c*	6.1E-02	c	3.1E-01	c	1.2E-01	c*		7.9E-05			
				3.0E+03	P						1	0.1	Nitrocellulose	9004-70-0	1.8E+08	nm	1.8E+09	nm					4.7E+07	n		1.0E+04			
1.3E+00	C	3.7E-04	C	7.0E-02	H						1	0.1	Nitrofurantoin	67-20-9	4.3E+03	n	4.3E+04	n					1.1E+03	n		4.7E-01			
1.7E-02	P			1.0E-04	P						1	0.1	Nitrofurazone	59-87-0	3.7E-01	c	1.3E+00	c	6.6E-03	c	3.3E-02	c	5.2E-02	c		4.6E-05			
											1	0.1	Nitroglycerin	55-63-0	6.1E+00	n	6.2E+01	n					1.5E+00	n		6.6E-04			
				1.0E-01	I						1	0.1	Nitroguanidine	556-88-7	6.1E+03	n	6.2E+04	n					1.6E+03	n		3.8E-01			
		9.0E-06	P			2.0E-02	P	V			1	1.8E+04	Nitromethane	75-52-5	4.9E+00	c*	2.5E+01	c*	2.7E-01	c*	1.4E+00	c*	5.4E-01	c*		1.2E-04			
		2.7E-03	H			2.0E-02	I	V			1	4.9E+03	Nitropropane, 2-	79-46-9	1.3E-02	c	6.4E-02	c	9.0E-04	c	4.5E-03	c	1.8E-03	c		4.7E-07			
2.7E+01	C	7.7E-03	C						M		1	0.1	Nitroso-N-ethylurea, N-	759-73-9	4.3E-03	c	6.4E-02	c	1.2E-04	c	1.6E-03	c	7.9E-04	c		1.9E-07			
1.2E+02	C	3.4E-02	C						M		1	0.1	Nitroso-N-methylurea, N-	684-93-5	9.6E-04	c	1.4E-02	c	2.8E-05	c	3.6E-04	c	1.8E-04	c		4.0E-08			
5.4E+00	I	1.6E-03	I						V		1	7.1E+03	Nitroso-di-N-butylamine, N-	924-16-3	8.7E-02	c	4.0E-01	c	1.5E-03	c	7.7E-03	c	2.4E-03	c		4.8E-06			
7.0E+00	I	2.0E-03	C								1	0.1	Nitroso-di-N-propylamine, N-	621-64-7	6.9E-02	c	2.5E-01	c	1.2E-03	c	6.1E-03	c	9.3E-03	c		7.0E-06			
2.8E+00	I	8.0E-04	C								1	0.1	Nitrosodiethanolamine, N-	1116-54-7	1.7E-01	c	6.2E-01	c	3.0E-03	c	1.5E-02	c	2.4E-02	c		4.8E-06			
1.5E+02	I	4.3E-02	I						M		1	0.1	Nitrosodiethylamine, N-	55-18-5	7.7E-04	c	1.1E-02	c	2.2E-05	c	2.9E-04	c	1.4E-04	c		5.2E-08			
5.1E+01	I	1.4E-02	I	8.0E-06	P	4.0E-05	X		M		1	0.1	Nitrosodimethylamine, N-	62-75-9	2.3E-03	c	3.4E-02	c	6.9E-05	c	8.8E-04	c	4.2E-04	c		1.0E-07			
4.9E-03	I	2.6E-06	C								1	0.1	Nitrosodiphenylamine, N-	86-30-6	9.9E+01	c	3.5E+02	c	9.4E-01	c	4.7E+00	c	1.0E+01	c		5.7E-02			
2.2E+01	I	6.3E-03	C								1	0.1	Nitrosomethylethylamine, N-	10595-95-6	2.2E-02	c	7.8E-02	c	3.9E-04	c	1.9E-03	c	3.0E-03	c		8.7E-07			
6.7E+00	C	1.9E-03	C								1	0.1	Nitrosomorpholine [N-]	59-89-2	7.3E-02	c	2.6E-01	c	1.3E-03	c	6.5E-03	c	1.0E-02	c		2.5E-06			
9.4E+00	C	2.7E-03	C								1	0.1	Nitrosopiperidine [N-]	100-75-4	5.2E-02	c	1.8E-01	c	9.0E-04	c	4.5E-03	c	7.1E-03	c		3.8E-06			
2.1E+00	I	6.1E-04	I								1	0.1	Nitrosopyrrolidine, N-	930-55-2	2.3E-01	c	8.2E-01	c	4.0E-03	c	2.0E-02	c	3.2E-02	c		1.2E-05			
2.2E-01	P			1.0E-04	X						1	0.1	Nitrotoluene, m-	99-08-1	6.1E+00	n	6.2E+01	n					1.3E+00	n		1.2E-03			
1.6E-02	P			9.0E-04	P			V			1	1.5E+03	Nitrotoluene, o-	88-72-2	2.9E+00	c*	1.3E+01	c*					2.7E-01	c*		2.5E-04			
				4.0E-03	P						1	0.1	Nitrotoluene, p-	99-99-0	3.0E+01	c**	1.1E+02	c*					3.7E+00	c*		3.4E-03			
				3.0E-04	X	2.0E-01	P	V			1	6.9E+00	Nonane, n-	111-84-2	2.1E+01	ns	2.3E+02	ns	2.1E+02	n	8.8E+02	n	4.6E+00	n		6.6E-02			
				4.0E-02	I						1	0.1	Norflurazon	27314-13-2	2.4E+03	n	2.5E+04	n					6.0E+02	n		3.9E+00			
				7.0E-04	I						1	0.1	Nustar	85509-19-9	4.3E+01	n	4.3E+02	n					8.3E+00	n		1.4E+00			
				3.0E-03	I						1	0.1	Octabromodiphenyl Ether	32536-52-0	1.8E+02	n	1.8E+03	n					4.7E+01	n		9.3E+00			
				5.0E-02	I						1	0.006	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0	3.8E+03	n	4.9E+04	n					7.8E+02	n		9.9E-01			
				2.0E-03	H						1	0.1	Octamethylpyrophosphoramide	152-16-9	1.2E+02	n	1.2E+03	n					3.1E+01	n		7.5E-03			
				5.0E-02	I						1	0.1	Oryzalin	19044-88-3	3.1E+03	n	3.1E+04	n					6.2E+02	n		1.1E+00			
				5.0E-03	I						1	0.1	Oxadiazon	19666-30-9	3.1E+02	n	3.1E+03	n					3.5E+01	n		3.6E-01			
				2.5E-02	I						1	0.1	Oxamyl	23135-22-0	1.5E+03	n	1.5E+04	n					3.9E+02	n	2.0E+02	8.6E-02	4.4E-02		
				1.3E-02	I						1	0.1	Paclobutrazol	76738-6															

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																												
Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>-1</sup>	k <sub>e</sub> y	IUR (ug/m <sup>3</sup> -day)	k <sub>e</sub> y	RfD <sub>o</sub> (mg/kg-day)	k <sub>e</sub> y	RfC <sub>i</sub> (mg/m <sup>3</sup> )	k <sub>e</sub> y	o <sub>1</sub> c	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)	
2.2E-03	C	6.3E-07	C	5.0E-02	I					1	0.1		Permethrin	52645-53-1	3.1E+03	n	3.1E+04	n					7.8E+02	n		1.9E+02		
										1	0.1		Phenacetin	62-44-2	2.2E+02	c	7.8E+02	c	3.9E+00	c	1.9E+01	c	3.0E+01	c		8.3E-03		
				2.5E-01	I					1	0.1		Phenmedipham	13684-63-4	1.5E+04	n	1.5E+05	nm					3.0E+03	n		1.6E+01		
				3.0E-01	I	2.0E-01	C			1	0.1		Phenol	108-95-2	1.8E+04	n	1.8E+05	nm	2.1E+02	n	8.8E+02	n	4.5E+03	n		2.6E+00		
				5.0E-04	X					1	0.1		Phenothiazine	92-84-2	3.1E+01	n	3.1E+02	n					3.2E+00	n		1.0E-02		
4.7E-02	H			6.0E-03	I					1	0.1		Phenylenediamine, m-	108-45-2	3.7E+02	n	3.7E+03	n					9.4E+01	n		2.5E-02		
										1	0.1		Phenylenediamine, o-	95-54-5	1.0E+01	c	3.7E+01	c					1.4E+00	c		3.8E-04		
				1.9E-01	H					1	0.1		Phenylenediamine, p-	106-50-3	1.2E+04	n	1.2E+05	nm					3.0E+03	n		7.9E-01		
1.9E-03	H			2.0E-04	H					1	0.1		Phenylphenol, 2-	90-43-7	2.5E+02	c	8.9E+02	c					2.6E+01	c		3.5E-01		
						3.0E-04	I	V		1		1.6E+03	Phorate	298-02-2	1.2E+01	n	1.2E+02	n					2.3E+00	n		2.6E-03		
										1			Phosgene	75-44-5	3.3E-01	n	1.4E+00	n	3.1E-01	n	1.3E+00	n						
				2.0E-02	I					1	0.1		Phosmet	732-11-6	1.2E+03	n	1.2E+04	n					2.9E+02	n		6.4E-02		
				4.9E+01	P					1			Phosphates, Inorganic															
										1			*Aluminum metaphosphate	13776-88-0	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Ammonium polyphosphate	68333-79-9	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Calcium pyrophosphate	7790-76-3	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Diammonium phosphate	7783-28-0	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Dicalcium phosphate	7757-93-9	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Dimagnesium phosphate	7782-75-4	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Dipotassium phosphate	7758-11-4	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Disodium phosphate	7558-79-4	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Monoaluminum phosphate	13530-50-2	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Monoammonium phosphate	7722-76-1	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Monocalcium phosphate	7758-23-8	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Monomagnesium phosphate	7757-86-0	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Monopotassium phosphate	7778-77-0	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Monosodium phosphate	7558-80-7	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Polyphosphoric acid	8017-16-1	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Potassium triphosphate	13845-36-8	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium acid pyrophosphate	7758-16-9	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium aluminum phosphate (acidic)	7785-88-8	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium aluminum phosphate (anhydrous)	10279-59-1	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium aluminum phosphate (tetrahydrate)	10305-76-7	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium hexametaphosphate	10124-56-8	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium polyphosphate	68915-31-1	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium trimetaphosphate	7785-84-4	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Sodium triphosphate	7758-29-4	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Tetrapotassium phosphate	7320-34-5	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Tetrasodium pyrophosphate	7722-88-5	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Trialuminum sodium tetra decahydrogenoctaorthophosphate (dihydrate)	15136-87-5	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Tricalcium phosphate	7758-87-4	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Trimagnesium phosphate	7757-87-1	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Tripotassium phosphate	7778-53-2	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				4.9E+01	P					1			*Trisodium phosphate	7601-54-9	3.8E+06	nm	5.0E+07	nm					7.6E+05	n				
				3.0E-04	I	3.0E-04	I			1			Phosphine	7803-51-2	2.3E+01	n	3.1E+02	n	3.1E-01	n	1.3E+00	n	4.7E+00	n				
				4.9E+01	P	1.0E-02	I			1			Phosphoric Acid	7664-38-2	3.0E+06	nm	2.7E+07	nm	1.0E+01	n	4.4E+01	n	7.6E+05	n				
				2.0E-05	I					1			Phosphorus, White	7723-14-0	1.6E+00	n	2.0E+01	n					3.1E-01	n		1.1E-03		
				1.0E+00	H					1	0.1		Phthalic Acid, P-	100-21-0	6.1E+04	n	6.2E+05	nm					1.5E+04	n		5.3E+00		
				2.0E+00	I	2.0E-02	C			1	0.1		Phthalic Anhydride	85-44-9	1.2E+05	nm	1.2E+06	nm	2.1E+01	n	8.8E+01	n	3.0E+04	n		6.6E+00		
				7.0E-02	I					1	0.1		Picloram	1918-02-1	4.3E+03	n	4.3E+04	n					1.1E+03	n	5.0E+02	2.9E-01	1.4E-01	
				1.0E-04	X					1	0.1		Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3	6.1E+00	n	6.2E+01	n					1.5E+00	n		1.0E-03		
				1.0E-02	I					1	0.1		Pirimiphos, Methyl	29232-93-7	6.1E+02	n	6.2E+03	n					9.1E+01	n		8.7E-02		
3.0E+01	C	8.6E-03	C	7.0E-06	H					1	0.1		Polybrominated Biphenyl															

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																											
Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>1</sup>	k e y	IUR (ug/m <sup>3</sup> ) <sup>1</sup>	k e y	RfD <sub>o</sub> (mg/kg-day)	k e y	RfC <sub>i</sub> (mg/m <sup>3</sup> ) <sup>1</sup>	k e y	o m u t a g e n	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	k e y	Industrial Soil (mg/kg)	k e y	Resident Air (ug/m <sup>3</sup> )	k e y	Industrial Air (ug/m <sup>3</sup> )	k e y	Tapwater (ug/L)	k e y	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)	
3.9E+03	E	1.1E+00	E	3.3E-08	E	1.3E-06	E			1	0.14	~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	1.1E-04	c*	3.8E-04	c*	2.1E-06	c	1.1E-05	c	1.7E-05	c*		7.2E-06		
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14	~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.5E-03		
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14	~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.4E-03		
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14	~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.5E-03		
3.9E+00	E	1.1E-03	E	3.3E-05	E	1.3E-03	E			1	0.14	~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	1.1E-01	c*	3.8E-01	c*	2.1E-03	c	1.1E-02	c	1.7E-02	c*		4.5E-03		
1.3E+04	E	3.8E+00	E	1.0E-08	E	4.0E-07	E			1	0.14	~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	3.4E-05	c*	1.1E-04	c*	6.4E-07	c	3.2E-06	c	5.2E-06	c*		1.3E-06		
2.0E+00	I	5.7E-04	I							1	0.14	~Polychlorinated Biphenyls (high risk)	1336-36-3	2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c						
4.0E-01	I	1.0E-04	I							1	0.14	~Polychlorinated Biphenyls (low risk)	1336-36-3					2.4E-02	c	1.2E-01	c	1.7E-01	c	5.0E-01	2.6E-02	7.8E-02	
7.0E-02	I	2.0E-05	I							1	0.14	~Polychlorinated Biphenyls (lowest risk)	1336-36-3					1.2E-01	c	6.1E-01	c						
1.3E+01	E	3.8E-03	E	1.0E-05	E	4.0E-04	E			1	0.14	~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	3.4E-02	c*	1.1E-01	c*	6.4E-04	c	3.2E-03	c	5.2E-03	c*		8.1E-04		
3.9E+01	E	1.1E-02	E	3.3E-06	E	1.3E-04	E			1	0.14	~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	1.1E-02	c*	3.8E-02	c*	2.1E-04	c	1.1E-03	c	1.7E-03	c*		2.7E-04		
				6.0E-04	I					1	0.1	Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	8.5E+05	nm	3.6E+06	nm	6.3E-01	n	2.6E+00	n						
				6.0E-02	I			V		1	0.13	<b>Polynuclear Aromatic Hydrocarbons (PAHs)</b>		83-32-9	3.4E+03	n	3.3E+04	n					4.0E+02	n		4.1E+00	
				3.0E-01	I			V		1	0.13	~Acenaphthene	120-12-7	1.7E+04	n	1.7E+05	nm					1.3E+03	n		4.2E+01		
7.3E-01	E	1.1E-04	C						M	1	0.13	~Benz[a]anthracene	56-55-3	1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c		1.0E-02		
1.2E+00	C	1.1E-04	C							1	0.13	~Benzo[j]fluoranthene	205-82-3	3.8E-01	c	1.3E+00	c	2.2E-02	c	1.1E-01	c	5.6E-02	c		6.7E-02		
7.3E+00	I	1.1E-03	C						M	1	0.13	~Benzo[a]pyrene	50-32-8	1.5E-02	c	2.1E-01	c	8.7E-04	c	1.1E-02	c	2.9E-03	c	2.0E-01	3.5E-03	2.4E-01	
7.3E-01	E	1.1E-04	C						M	1	0.13	~Benzo[b]fluoranthene	205-99-2	1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c		3.5E-02		
7.3E-02	E	1.1E-04	C						M	1	0.13	~Benzo[k]fluoranthene	207-08-9	1.5E+00	c	2.1E+01	c	8.7E-03	c	1.1E-01	c	2.9E-01	c		3.5E-01		
7.3E-03	E	1.1E-05	C						M	1	0.13	~Chrysene	218-01-9	1.5E+01	c	2.1E+02	c	8.7E-02	c	1.1E+00	c	2.9E+00	c		1.1E+00		
7.3E+00	E	1.2E-03	C						M	1	0.13	~Dibenz[a,h]anthracene	53-70-3	1.5E-02	c	2.1E-01	c	8.0E-04	c	1.0E-02	c	2.9E-03	c		1.1E-02		
1.2E+01	C	1.1E-03	C							1	0.13	~Dibenz[a,e]pyrene	192-65-4	3.8E-02	c	1.3E-01	c	2.2E-03	c	1.1E-02	c	5.6E-03	c		7.3E-02		
2.5E+02	C	7.1E-02	C						M	1	0.13	~Dimethylbenz[a]anthracene, 7,12-	57-97-6	4.3E-04	c	6.2E-03	c	1.4E-05	c	1.7E-04	c	8.6E-05	c		8.5E-05		
				4.0E-02	I					1	0.13	~Fluoranthene	206-44-0	2.3E+03	n	2.2E+04	n					6.3E+02	n		7.0E+01		
7.3E-01	E	1.1E-04	C					V		1	0.13	~Fluorene	86-73-7	2.3E+03	n	2.2E+04	n					2.2E+02	n		4.0E+00		
				4.0E-02	I				M	1	0.13	~Indeno[1,2,3-cd]pyrene	193-39-5	1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c		1.2E-01		
2.9E-02	P			7.0E-02	A			V		1	0.13	~Methylnaphthalene, 1-	90-12-0	1.6E+01	c	5.3E+01	c					9.7E-01	c		5.1E-03		
				4.0E-03	I			V		1	0.13	~Methylnaphthalene, 2-	91-57-6	2.3E+02	n	2.2E+03	ns					2.7E+01	n		1.4E-01		
		3.4E-05	C	2.0E-02	I	3.0E-03	I	V		1	0.13	~Naphthalene	91-20-3	3.6E+00	c*	1.8E+01	c*	7.2E-02	c*	3.6E-01	c*	1.4E-01	c*		4.7E-04		
1.2E+00	C	1.1E-04	C							1	0.13	~Nitropyrene, 4-	57835-92-4	3.8E-01	c	1.3E+00	c	2.2E-02	c	1.1E-01	c	1.6E-02	c		2.8E-03		
1.5E-01	I			3.0E-02	I			V		1	0.13	~Pyrene	129-00-0	1.7E+03	n	1.7E+04	n					8.7E+01	n		9.5E+00		
				9.0E-03	I					1	0.1	~Prochloraz	67747-09-5	3.2E+00	c	1.1E+01	c					3.2E-01	c		1.6E-03		
				6.0E-03	H					1	0.1	~Profluralin	26399-36-0	3.7E+02	n	3.7E+03	n					1.9E+01	n		1.2E+00		
				1.5E-02	I					1	0.1	~Prometon	1610-18-0	9.2E+02	n	9.2E+03	n					1.9E+02	n		9.2E-02		
				4.0E-03	I					1	0.1	~Prometryn	7287-19-6	2.4E+02	n	2.5E+03	n					4.5E+01	n		6.9E-02		
				1.3E-02	I					1	0.1	~Propachlor	1918-16-7	7.9E+02	n	8.0E+03	n					1.9E+02	n		1.2E-01		
				5.0E-03	I					1	0.1	~Propanil	709-98-8	3.1E+02	n	3.1E+03	n					6.3E+01	n		3.5E-02		
				2.0E-02	I					1	0.1	~Propargite	2312-35-8	1.2E+03	n	1.2E+04	n					1.2E+02	n		8.8E+00		
				2.0E-03	I					1	0.1	~Propargyl Alcohol	107-19-7	1.2E+02	n	1.2E+03	n					3.1E+01	n		6.4E-03		
				2.0E-02	I					1	0.1	~Propazine	139-40-2	1.2E+03	n	1.2E+04	n					2.6E+02	n		2.3E-01		
				2.0E-02	I					1	0.1	~Propham	122-42-9	1.2E+03	n	1.2E+04	n					2.7E+02	n		1.7E-01		
				1.3E-02	I					1	0.1	~Propiconazole	60207-90-1	7.9E+02	n	8.0E+03	n					1.6E+02	n		5.3E-01		
						8.0E-03	I	V		1	3.3E+04	~Propionaldehyde	123-38-6	8.0E+01	n	3.4E+02	n	8.3E+00	n	3.5E+01	n	1.7E+01	n		3.4E-03		
				1.0E-01	X	1.0E+00	X	V		1	0.1	~Propyl benzene	103-65-1	3.4E+03	ns	2.1E+04	ns	1.0E+03	n	4.4E+03	n	5.3E+02	n		9.9E-01		
				3.0E+00	C	V				1	0.1	~Propylene	115-07-1	2.4E+03	ns	1.0E+04	ns	3.1E+03	n	1.3E+04	n	6.3E+03	n		6.0E+00		
				2.0E+01	P					1	0.1	~Propylene Glycol	57-55-6	1.2E+06	nm	1											

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																																		
Toxicity and Chemical-specific Information													Contaminant										Screening Levels										Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>-1</sup>	k <sub>e</sub> y	IUR (ug/m <sup>3</sup> ) <sup>-1</sup>	k <sub>e</sub> y	RfD <sub>o</sub> (mg/kg-day)	k <sub>e</sub> y	RfC <sub>1</sub> (mg/m <sup>3</sup> )	k <sub>e</sub> y	o y	muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m <sup>3</sup> )	key	Industrial Air (ug/m <sup>3</sup> )	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)							
				9.0E-02	I						1	0.1	Sethoxydim	74051-80-2	5.5E+03	n	5.5E+04	n					7.8E+02	n		6.9E+00								
						3.0E-03	C				1		Silica (crystalline, respirable)	7631-86-9	4.3E+06	nm	1.8E+07	nm	3.1E+00	n	1.3E+01	n												
1.2E-01	H			5.0E-03	I					0.04			Silver	7440-22-4	3.9E+02	n	5.1E+03	nm					7.1E+01	n		6.0E-01								
				5.0E-03	I						1	0.1	Simazine	122-34-9	4.1E+00	c*	1.4E+01	c					5.2E-01	c	4.0E+00	2.6E-04	2.0E-03							
				1.3E-02	I						1	0.1	Sodium Acifluorfen	62476-59-9	7.9E+02	n	8.0E+03	n					2.0E+02	n		1.6E+00								
2.7E-01	H			4.0E-03	I						1		Sodium Azide	26628-22-8	3.1E+02	n	4.1E+03	n					6.2E+01	n										
				3.0E-02	I						1	0.1	Sodium Diethyldithiocarbamate	148-18-5	1.8E+00	c	6.4E+00	c					2.5E-01	c										
				5.0E-02	A	1.3E-02	C				1		Sodium Fluoride	7681-49-4	3.9E+03	n	5.1E+04	n	1.4E+01	n	5.7E+01	n	7.8E+02	n										
				2.0E-05	I						1	0.1	Sodium Fluoroacetate	62-74-8	1.2E+00	n	1.2E+01	n					3.1E-01	n		6.3E-05								
				1.0E-03	H						1		Sodium Metavanadate	13718-26-8	7.8E+01	n	1.0E+03	n					1.6E+01	n										
2.4E-02	H			3.0E-02	I						1	0.1	Stirofos (Tetrachlorovinphos)	961-11-5	2.0E+01	c*	7.2E+01	c					2.4E+00	c		7.0E-03								
				6.0E-01	I						1		Strontium, Stable	7440-24-6	4.7E+04	n	6.1E+05	nm					9.3E+03	n		3.3E+02								
				3.0E-04	I						1	0.1	Strychnine	57-24-9	1.8E+01	n	1.8E+02	n					4.6E+00	n		5.1E-02								
				2.0E-01	I	1.0E+00	I	V			1	8.7E+02	Styrene	100-42-5	6.3E+03	ns	3.6E+04	ns	1.0E+03	n	4.4E+03	n	1.1E+03	n	1.0E+02	1.2E+00	1.1E-01							
				1.0E-03	P	2.0E-03	P				1	0.1	Sulfolane	126-33-0	6.1E+01	n	6.2E+02	ns	2.1E+00	n	8.8E+00	n	1.6E+01	n		3.4E-03								
				8.0E-04	P						1	0.1	Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9	4.9E+01	n	4.9E+02	n					1.3E+01	n		7.4E-02								
						1.0E-03	C				1		Sulfuric Acid	7664-93-9	1.4E+06	nm	6.0E+06	nm	1.0E+00	n	4.4E+00	n												
				2.5E-02	I						1	0.1	Systhane	88671-89-0	1.5E+03	n	1.5E+04	n					3.5E+02	n		4.3E+00								
				3.0E-02	H						1	0.1	TCMTB	21564-17-0	1.8E+03	n	1.8E+04	n					3.7E+02	n		2.6E+00								
				7.0E-02	I						1	0.1	Tebuthiuron	34014-18-1	4.3E+03	n	4.3E+04	n					1.1E+03	n		3.0E-01								
				2.0E-02	H						1	0.1	Temephos	3383-96-8	1.2E+03	n	1.2E+04	n					3.1E+02	n		6.0E+01								
				1.3E-02	I						1	0.1	Terbacil	5902-51-2	7.9E+02	n	8.0E+03	n					2.0E+02	n		5.9E-02								
				2.5E-05	H						1	0.1	Terbufos	13071-79-9	1.5E+00	n	1.5E+01	n					1.8E-01	n		3.9E-04								
				1.0E-03	I						1	0.1	Terbutryn	886-50-0	6.1E+01	n	6.2E+02	n					1.0E+01	n		1.4E-02								
				1.0E-04	I						1	0.1	Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1	6.1E+00	n	6.2E+01	n					1.6E+00	n		4.2E-02								
				3.0E-04	I						1	0.1	Tetrachlorobenzene, 1,2,4,5-	95-94-3	1.8E+01	n	1.8E+02	n					1.2E+00	n		5.8E-03								
2.6E-02	I	7.4E-06	I	3.0E-02	I			V			1	6.8E+02	Tetrachloroethane, 1,1,1,2-	630-20-6	1.9E+00	c	9.3E+00	c	3.3E-01	c	1.7E+00	c	5.0E-01	c		1.9E-04								
2.0E-01	I	5.8E-05	C	2.0E-02	I			V			1	1.9E+03	Tetrachloroethane, 1,1,2,2-	79-34-5	5.6E-01	c	2.8E+00	c	4.2E-02	c	2.1E-01	c	6.6E-02	c		2.6E-05								
2.1E-03	I	2.6E-07	I	6.0E-03	I	4.0E-02	I	V			1	1.7E+02	Tetrachloroethylene	127-18-4	2.2E+01	c**	1.1E+02	c**	9.4E+00	c**	4.7E+01	c**	9.7E+00	c**	5.0E+00	4.4E-03	2.3E-03							
				3.0E-02	I						1	0.1	Tetrachlorophenol, 2,3,4,6-	58-90-2	1.8E+03	n	1.8E+04	n					1.7E+02	n		1.1E+00								
2.0E+01	H										1	0.1	Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	2.4E-02	c	8.6E-02	c					3.4E-03	c		1.1E-05								
				5.0E-04	I						1	0.1	Tetraethyl Dithiopyrophosphate	3689-24-5	3.1E+01	n	3.1E+02	n					5.3E+00	n		3.9E-03								
				4.0E-03	P	8.0E+01	I	V			1	1.1E+03	Tetrafluoroethane, 1,1,1,2-	811-97-2	1.1E+05	nms	4.6E+05	nms	8.3E+04	n	3.5E+05	n	1.7E+05	n		9.3E+01								
											1	0.1	Tetryl (Trinitrophenylmethylnitramine)	479-45-8	2.4E+02	n	2.5E+03	n					6.3E+01	n		5.9E-01								
				1.0E-05	X						1		Thallium (Soluble Salts)	7440-28-0	7.8E-01	n	1.0E+01	n					1.6E-01	n	2.0E+00	1.1E-02	1.4E-01							
				1.0E-02	I						1	0.1	Thiobencarb	28249-77-6	6.1E+02	n	6.2E+03	n					1.2E+02	n		4.2E-01								
				7.0E-02	X						1	0.008	Thiodiglycol	111-48-8	5.4E+03	n	6.8E+04	n					1.1E+03	n		2.2E-01								
				3.0E-04	H						1	0.1	Thiofanox	39196-18-4	1.8E+01	n	1.8E+02	n					4.1E+00	n		1.4E-03								
				8.0E-02	I						1	0.1	Thiophanate, Methyl	23564-05-8	4.9E+03	n	4.9E+04	n					1.2E+03	n		1.1E+00								
				5.0E-03	I						1	0.1	Thiram	137-26-8	3.1E+02	n	3.1E+03	n					7.6E+01	n		1.1E-01								
				6.0E-01	H						1		Tin	7440-31-5	4.7E+04	n	6.1E+05	nm					9.3E+03	n		2.3E+03								
						1.0E-04	A				1		Titanium Tetrachloride	7550-45-0	1.4E+05	nm	6.0E+05	nm	1.0E-01	n	4.4E-01	n												
				8.0E-02	I	5.0E+00	I	V			1	8.2E+02	Toluene	108-88-3	5.0E+03	ns	4.5E+04	ns	5.2E+03	n	2.2E+04	n	8.6E+02	n	1.0E+03	5.9E-01	6.9E-01							
1.8E-01	X			1.0E-04	X						1	0.1	Toluene-2,5-diamine	95-70-5	2.7E+00	c**	9.6E+00	c**					3.7E-01	c**		1.2E-04								
1.9E-01	H										1	0.1	Toluidine, p-	106-49-0	2.6E+00	c	9.1E+00	c					3.4E-01	c		1.4E-04								
1.1E+00	I	3.2E-04	I								1	0.1	Toxaphene	8001-35-2	4.4E-01	c	1.6E+00	c	7.6E-03	c	3.8E-02	c	1.3E-02	c	3.0E+00	2.1E-03	4.6E-01							
				7.5E-03	I						1	0.1	Tralometrin	66841-25-6	4.6E+02	n	4.6E+03	n					1.2E+02	n		4.5E+01								
				3.0E-04	A						1	0.1	Tri-n-butyltin	688-73-3	1.8E+01	n	1.8E+02	n					4.7E+00	n		1.0E-01								
				1.3E-02	I						1	0.1	Triallate	2303-17-5	7.9E+02																			

Regional Screening Level (RSL) Summary Table April 2012

Key I IRIS; P PPRTV; A ATSDR; C Cal EPA; X PPRTV Appendix; H HEAST; J New Jersey; Y New York; O EPA Office of Water; E Environmental Criteria and Assessment Office; S see user guide Section 5; L see user guide on lead; M mutagen; V volatile; F See FAQ; c cancer; * where n SL < 100X c SL; ** where n SL < 10X c SL; n noncancer; m Concentration may exceed ceiling limit (See User Guide); s Concentration may exceed Csat (See User Guide); SSL values are based on DAF 1																															
Toxicity and Chemical-specific Information													Contaminant										Screening Levels							Protection of Ground Water SSLs	
SFO (mg/kg-day) <sup>-1</sup>	k e y	IUR (ug/m <sup>3</sup> ) <sup>-1</sup>	k e y	RfD <sub>0</sub> (mg/kg-day)	k e y	RfC <sub>1</sub> (mg/m <sup>3</sup> )	k e y	o c muta- gen	GIABS	ABS	C <sub>sat</sub> (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	k e y	Industrial Soil (mg/kg)	k e y	Resident Air (ug/m <sup>3</sup> )	k e y	Industrial Air (ug/m <sup>3</sup> )	k e y	Tapwater (ug/L)	k e y	MCL (ug/L)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)					
1.1E-02	I	3.1E-06	I	1.0E-03	P					1	0.1	Trichlorophenol, 2,4,6-	88-06-2	4.4E+01	c**	1.6E+02	c**	7.8E-01	c	4.0E+00	c	3.5E+00	c**		1.3E-02						
				1.0E-02	I					1	0.1	Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	6.1E+02	n	6.2E+03	n					1.2E+02	n		5.2E-02						
				8.0E-03	I					1	0.1	Trichlorophenoxypropionic acid, -2,4,5	93-72-1	4.9E+02	n	4.9E+03	n					8.4E+01	n	5.0E+01	4.6E-02	2.8E-02					
				5.0E-03	I			V		1	1.3E+03	Trichloropropane, 1,1,2-	598-77-6	3.9E+02	n	5.1E+03	ns					7.8E+01	n		3.1E-02						
3.0E+01	I			4.0E-03	I	3.0E-04	I	V	M	1	1.4E+03	Trichloropropane, 1,2,3-	96-18-4	5.0E-03	c	9.5E-02	c	3.1E-01	n	1.3E+00	n	6.5E-04	c		2.8E-07						
				3.0E-03	X	3.0E-04	P	V		1	4.5E+02	Trichloropropene, 1,2,3-	96-19-5	7.8E-01	n	3.3E+00	n	3.1E-01	n	1.3E+00	n	6.2E-01	n		3.1E-04						
				3.0E-03	I					1	0.1	Tridiphen	58138-08-2	1.8E+02	n	1.8E+03	n					4.7E+01	n		3.3E-01						
						7.0E-03	I	V		1	2.8E+04	Triethylamine	121-44-8	1.2E+02	n	5.2E+02	n	7.3E+00	n	3.1E+01	n	1.5E+01	n		4.4E-03						
7.7E-03	I			7.5E-03	I					1	0.1	Trifluralin	1582-09-8	6.3E+01	c**	2.2E+02	c*					2.2E+00	c*		7.2E-02						
2.0E-02	P			1.0E-02	P					1	0.1	Trimethyl Phosphate	512-56-1	2.4E+01	c*	8.6E+01	c*					3.4E+00	c*		7.4E-04						
						5.0E-03	P	V		1	2.9E+02	Trimethylbenzene, 1,2,3-	526-73-8	5.3E+01	n	2.2E+02	n	5.2E+00	n	2.2E+01	n	1.0E+01	n		1.5E-02						
						7.0E-03	P	V		1	2.2E+02	Trimethylbenzene, 1,2,4-	95-63-6	6.2E+01	n	2.6E+02	ns	7.3E+00	n	3.1E+01	n	1.5E+01	n		2.1E-02						
				1.0E-02	X			V		1	1.8E+02	Trimethylbenzene, 1,3,5-	108-67-8	7.8E+02	ns	1.0E+04	ns					8.7E+01	n		1.2E-01						
				3.0E-02	I					1	0.019	Trinitrobenzene, 1,3,5-	99-35-4	2.2E+03	n	2.7E+04	n					4.6E+02	n		1.7E+00						
3.0E-02	I			5.0E-04	I					1	0.032	Trinitrotoluene, 2,4,6-	118-96-7	1.9E+01	c**	7.9E+01	c**					2.2E+00	c**		1.3E-02						
				2.0E-02	P					1	0.1	Triphenylphosphine Oxide	791-28-6	1.2E+03	n	1.2E+04	n					2.8E+02	n		1.2E+00						
2.0E-02	P			7.0E-03	P					1	0.1	Tris(2-chloroethyl)phosphate	115-96-8	2.4E+01	c*	8.6E+01	c*					3.3E+00	c*		3.2E-03						
3.2E-03	P			1.0E-01	P					1	0.1	Tris(2-ethylhexyl)phosphate	78-42-2	1.5E+02	c*	5.4E+02	c					2.1E+01	c*		1.0E+02						
				3.0E-03	I					1		Uranium (Soluble Salts)	NA	2.3E+02	n	3.1E+03	n					4.7E+01	n	3.0E+01	2.1E+01	1.4E+01					
1.0E+00	C	2.9E-04	C					M		1	0.1	Urethane	51-79-6	1.2E-01	c	1.7E+00	c	3.3E-03	c	4.2E-02	c	2.1E-02	c		4.8E-06						
		8.3E-03	P	9.0E-03	I	7.0E-06	P		0.026			Vanadium Pentoxide	1314-62-1	4.0E+02	c**	2.0E+03	c**	2.9E-04	c*	1.5E-03	c*	1.1E+02	n								
				5.0E-03	S					1		Vanadium and Compounds	NA	3.9E+02	n	5.2E+03	n					7.8E+01	n		7.8E+01						
				1.0E-03	I					1	0.1	Vernolate	1929-77-7	6.1E+01	n	6.2E+02	n					8.3E+00	n		6.6E-03						
				2.5E-02	I					1	0.1	Vinclozolin	50471-44-8	1.5E+03	n	1.5E+04	n					3.4E+02	n		2.6E-01						
				1.0E+00	H	2.0E-01	I	V		1	2.8E+03	Vinyl Acetate	108-05-4	9.7E+02	n	4.1E+03	ns	2.1E+02	n	8.8E+02	n	4.1E+02	n		8.7E-02						
		3.2E-05	H			3.0E-03	I	V		1	0.0E+00	Vinyl Bromide	593-60-2	1.1E-01	c*s	5.6E-01	c*s	7.6E-02	c*	3.8E-01	c*	1.5E-01	c*		4.4E-05						
7.2E-01	I	4.4E-06	I	3.0E-03	I	1.0E-01	I	V	M	1	3.9E+03	Vinyl Chloride	75-01-4	6.0E-02	c	1.7E+00	c	1.6E-01	c	2.8E+00	c	1.5E-02	c	2.0E+00	5.3E-06	6.9E-04					
				3.0E-04	I					1	0.1	Warfarin	81-81-2	1.8E+01	n	1.8E+02	n					4.4E+00	n		4.6E-03						
				2.0E-01	S	1.0E-01	S	V		1	3.9E+02	Xylene, P-	106-42-3	6.0E+02	ns	2.6E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.8E-01						
				2.0E-01	S	1.0E-01	S	V		1	3.9E+02	Xylene, m-	108-38-3	5.9E+02	ns	2.5E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.8E-01						
				2.0E-01	S	1.0E-01	S	V		1	4.3E+02	Xylene, o-	95-47-6	6.9E+02	ns	3.0E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01						
				2.0E-01	I	1.0E-01	I	V		1	2.6E+02	Xylenes	1330-20-7	6.3E+02	ns	2.7E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n	1.0E+04	1.9E-01	9.8E+00					
				3.0E-04	I					1		Zinc Phosphide	1314-84-7	2.3E+01	n	3.1E+02	n					4.7E+00	n								
				3.0E-01	I					1		Zinc and Compounds	7440-66-6	2.3E+04	n	3.1E+05	nm					4.7E+03	n		2.9E+02						
				5.0E-02	I					1	0.1	Zineb	12122-67-7	3.1E+03	n	3.1E+04	n					7.8E+02	n		2.3E+00						

## **APPENDIX F**

**TDD NO. TO-0019-11-10-01 AND AMENDMENTS A - C**

Assessment/Inspection Activities  
(CERCLA PIPELINE FUNDS - FOR  
SITE ASSESSMENT GROUP USE) (  
0019)  
Weston Solutions, Inc.

! = required field

<b>TDD Name:</b> Delta Shipyard Reassessment		<b>! Period:</b> Base Period	
<b>! Purpose:</b> Work Assignment Initiation			
<b>! Priority:</b> Medium		<b>! Start Date:</b> 10/13/2011	
<b>Overtime:</b> Yes		<b>! Completion Date:</b> 02/15/2012	
<b>! Funding Category:</b> Removal		<b>Invoice Unit:</b>	
<b>! Project/Site Name:</b> Delta Shipyard Reassessment		<b>WorkArea:</b> ASSESSMENT/INSPECTIONS ACTIVITIES	
<b>Project Address:</b> Industrial Blvd.		<b>Activity:</b> Site Reassessment (SR)	
<b>County:</b> Terrebonne		<b>Work Area Code:</b>	
<b>City, State:</b> Houma, La		<b>Activity Code:</b> RS	
<b>Zip:</b> 70360		<b>EMERGENCY CODE:</b> <input type="checkbox"/> KAT <input type="checkbox"/> RIT	
<b>! SSID:</b> 06GC		<b>FPN:</b>	
<b>CERCLIS:</b> LAD058475419		<b>Performance Based:</b> No	
<b>Operable Unit:</b>			
<b>Authorized TDD Ceiling:</b>		<b>Cost/Fee</b>	<b>LOE</b>
<b>Previous Action(s):</b>		\$0.00	0.0
<b>This Action:</b>		\$15,000.00	0.0
<b>New Total:</b>		\$15,000.00	0.0

**Specific Elements** Gather and evaluate new information on a site previously assessed under the Superfund program.

**Description of Work:**

Conduct a site re-assessment of the Delta Shipyard Facility, coordinate with Site Assessment Manager Brenda Cook to obtain copies of all existing federal and state documents including all analytical data, site assessments reports generated through the state clean-up of this facility. Perform review of analytical data to determine its appropriateness for NPL listing, gather pertinent target information and prepare a HRS site score using Quickscore to determine NPL eligibility for potential NPL inclusion of this site. Conduct an on-site recon of the site/meet with EPA SAM and LDEQ to gather all existing data. Deliverable to be a cover memorandum summarizing the existing data, targets, and detailing any known data gaps and draft HRS score sheets using the HRS quick-score or word perfect templates.

**Accounting and Appropriation Information**

**SFO: 22**

Line	DCN	IFMS	Budget/ FY	Appropriati on Code	Budget Org Code	Program Element	Object Class	Site Project	Cost Org Code	Amount
1	PLC016	XXX	10	TCD	6A00P	302DD2C	2505	06GCRS00	C001	\$15,000.00

Funding Summary:	Funding
<b>Previous:</b>	\$0.00
<b>This Action:</b>	\$15,000.00

**Funding Category**  
Removal

**Total:**

\$15,000.00

**Section**

**- Signed by Terri Lewis/DC/USEPA/US on 09/30/2011 10:15:02 AM, according to Abel Farias/start6/rfv**

**Comments:** forwarded per ticket 42115

**:** Terri Lewis

**Date:** 09/30/2011

**Phone #:**

**Project Officer Section - Signed by Cora Stanley/R6/USEPA/US on 10/13/2011 09:11:30 AM, according to A**

**Project Officer:** Linda Carter

**Date:** 10/12/2011

**Contracting Officer Section - Signed by Cora Stanley/R6/USEPA/US on 10/13/2011 09:11:30 AM, according**

**Contracting Officer:** Cora Stanley

**Date:** 10/13/2011

**Contractor Section - Signed by Robert Beck/start6/rfw-start/us on 10/15/2011 11:41:30 AM, according to**

- ☒ No      During the past three (3) calendar years has your company , or any of your employees that will  
☐ Yes      be working at this site , previously performed work at this site /facility?

**Contractor Contact:** Robert Beck

**Date:** 10/15/2011

**START3**  
**Technical Direction Document**

TDD #: TO-0019-11-10-01  
Amendment#:A  
Contract: EP-W-06-042

Assessment/Inspection Activities  
(CERCLA PIPELINE FUNDS - FOR  
SITE ASSESSMENT GROUP USE) (  
0019)  
Weston Solutions, Inc.

! = required field

<b>TDD Name:</b> Delta Shipyard Reassessment		<b>! Period:</b> Base Period	
<b>! Purpose:</b> Change Period of Performance			
<b>! Priority:</b> Medium		<b>! Start Date:</b> 10/13/2011	
<b>Overtime:</b> Yes		<b>! Completion Date:</b> 08/01/2012	
<b>! Funding Category:</b> Removal		<b>Invoice Unit:</b>	
<b>! Project/Site Name:</b> Delta Shipyard Reassessment		<b>WorkArea:</b> ASSESSMENT/INSPECTIONS ACTIVITIES	
<b>Project Address:</b> Industrial Blvd.		<b>Activity:</b> Site Reassessment (SR)	
<b>County:</b> Terrebonne		<b>Work Area Code:</b>	
<b>City, State:</b> Houma, La		<b>Activity Code:</b> RS	
<b>Zip:</b> 70360		<b>EMERGENCY CODE:</b> <input type="checkbox"/> KAT <input type="checkbox"/> RIT	
<b>! SSID:</b> 06GC		<b>FPN:</b>	
<b>CERCLIS:</b> LAD058475419		<b>Performance Based:</b> No	
<b>Operable Unit:</b>			
<b>Authorized TDD Ceiling:</b>		<b>Cost/Fee</b>	<b>LOE</b>
<b>Previous Action(s):</b>		\$15,000.00	0.0
<b>This Action:</b>		\$0.00	0.0
<b>New Total:</b>		\$15,000.00	0.0

**Specific Elements** Gather and evaluate new information on a site previously assessed under the Superfund program.

**Description of Work:**

Amendment A extends the POP to 08/01/2012 to allow time for EPA to initiate early PRP searches. In addition deliverable will include draft sampling plan. There is no increase in cost/fee.

Conduct a site re-assessment of the Delta Shipyard Facility, coordinate with Site Assessment Manager Brenda Cook to obtain copies of all existing federal and state documents including all analytical data, site assessments reports generated through the state clean-up of this facility. Perform review of analytical data to determine its appropriateness for NPL listing, gather pertinent target information and prepare a HRS site score using Quickscore to determine NPL eligibility for potential NPL inclusion of this site. Conduct an on-site recon of the site/meet with EPA SAM and LDEQ to gather all existing data. Deliverable to be a cover memorandum summarizing the existing data, targets, and detailing any known data gaps and draft HRS score sheets using the HRS quick-score or word perfect templates.

**Accounting and Appropriation Information**

**SFO:**

Line	DCN	IFMS	Budget/ FY	Appropriati on Code	Budget Org Code	Program Element	Object Class	Site Project	Cost Org Code	Amount
1										\$0.00

Funding Summary:		Funding
	Previous:	\$15,000.00
	This Action:	\$0.00
	Total:	\$15,000.00

# Funding Category

Removal

## Section

- Signed by Brenda Cook/R6/USEPA/US on 02/09/2012 02:23:28 PM, according to Abel Farias/start6/r

: Brenda Cook

Date: 02/09/2012

Phone #:

Project Officer Section - Signed by Linda Carter/R6/USEPA/US on 02/10/2012 06:51:54 AM, according to Al

Project Officer: Linda Carter

Date: 02/09/2012

Contracting Officer Section - Signed by Cora Stanley/R6/USEPA/US on 02/09/2012 02:52:10 PM, according

Contracting Officer: Cora Stanley

Date: 02/09/2012

Contractor Section - Signed by Robert Beck/start6/rfw-start/us on 02/18/2012 08:01:07 PM, according to

- ☒ No During the past three (3) calendar years has your company , or any of your employees that will  
☐ Yes be working at this site , previously performed work at this site /facility?

Contractor Contact: Robert Beck

Date: 02/18/2012

Assessment/Inspection Activities  
(CERCLA PIPELINE FUNDS - FOR  
SITE ASSESSMENT GROUP USE) (  
0019)  
Weston Solutions, Inc.

! = required field

<b>TDD Name:</b> Delta Shipyard Reassessment		<b>! Period:</b> Base Period	
<b>! Purpose:</b> Work Assignment Initiation			
<b>! Priority:</b> Medium		<b>! Start Date:</b> 10/13/2011	
<b>Overtime:</b> Yes		<b>! Completion Date:</b> 02/15/2012	
<b>! Funding Category:</b> Removal		<b>Invoice Unit:</b>	
<b>! Project/Site Name:</b> Delta Shipyard Reassessment		<b>WorkArea:</b> ASSESSMENT/INSPECTIONS ACTIVITIES	
<b>Project Address:</b> Industrial Blvd.		<b>Activity:</b> Site Reassessment (SR)	
<b>County:</b> Terrebonne		<b>Work Area Code:</b>	
<b>City, State:</b> Houma, La		<b>Activity Code:</b> RS	
<b>Zip:</b> 70360		<b>EMERGENCY CODE:</b> <input type="checkbox"/> KAT <input type="checkbox"/> RIT	
<b>! SSID:</b> 06GC		<b>FPN:</b>	
<b>CERCLIS:</b> LAD058475419		<b>Performance Based:</b> No	
<b>Operable Unit:</b>			
<b>Authorized TDD Ceiling:</b>		<b>Cost/Fee</b>	<b>LOE</b>
<b>Previous Action(s):</b>		\$0.00	0.0
<b>This Action:</b>		\$15,000.00	0.0
<b>New Total:</b>		\$15,000.00	0.0

**Specific Elements** Gather and evaluate new information on a site previously assessed under the Superfund program.

**Description of Work:**

Conduct a site re-assessment of the Delta Shipyard Facility, coordinate with Site Assessment Manager Brenda Cook to obtain copies of all existing federal and state documents including all analytical data, site assessments reports generated through the state clean-up of this facility. Perform review of analytical data to determine its appropriateness for NPL listing, gather pertinent target information and prepare a HRS site score using Quickscore to determine NPL eligibility for potential NPL inclusion of this site. Conduct an on-site recon of the site/meet with EPA SAM and LDEQ to gather all existing data. Deliverable to be a cover memorandum summarizing the existing data, targets, and detailing any known data gaps and draft HRS score sheets using the HRS quick-score or word perfect templates.

**Accounting and Appropriation Information**

**SFO:** 22

Line	DCN	IFMS	Budget/ FY	Appropriati on Code	Budget Org Code	Program Element	Object Class	Site Project	Cost Org Code	Amount
1	PLC016	XXX	10	TCD	6A00P	302DD2C	2505	06GCRS00	C001	\$15,000.00

Funding Summary:	Funding
<b>Previous:</b>	\$0.00
<b>This Action:</b>	\$15,000.00

**Funding Category**  
Removal

**Total:**

\$15,000.00

**Section**

**- Signed by Terri Lewis/DC/USEPA/US on 09/30/2011 10:15:02 AM, according to Abel Farias/start6/rfv**

**Comments:** forwarded per ticket 42115

**:** Terri Lewis

**Date:** 09/30/2011

**Phone #:**

**Project Officer Section - Signed by Cora Stanley/R6/USEPA/US on 10/13/2011 09:11:30 AM, according to A**

**Project Officer:** Linda Carter

**Date:** 10/12/2011

**Contracting Officer Section - Signed by Cora Stanley/R6/USEPA/US on 10/13/2011 09:11:30 AM, according**

**Contracting Officer:** Cora Stanley

**Date:** 10/13/2011

**Contractor Section - Signed by Robert Beck/start6/rfw-start/us on 10/15/2011 11:41:30 AM, according to**

- ☒ No During the past three (3) calendar years has your company , or any of your employees that will  
☐ Yes be working at this site , previously performed work at this site /facility?

**Contractor Contact:** Robert Beck

**Date:** 10/15/2011

**START3**  
**Technical Direction Document**

TDD #: TO-0019-11-10-01  
Amendment#: C  
Contract: EP-W-06-042

Assessment/Inspection Activities  
(CERCLA PIPELINE FUNDS - FOR  
SITE ASSESSMENT GROUP USE) (0019)  
Weston Solutions, Inc.

! = required field ☐ Moved To EAS

<b>TDD Name:</b> Delta Shipyard Reassessment		<b>! Period:</b> Base Period	
<b>! Purpose:</b> Change Period of Performance, Incremental Funding			
<b>! Priority:</b> Medium		<b>! Start Date:</b> 10/13/2011	
<b>Overtime:</b> Yes		<b>! Completion Date:</b> 10/02/2012	
<b>! Funding Category:</b> Removal		<b>Invoice Unit:</b>	
<b>! Project/Site Name:</b> Delta Shipyard Reassessment		<b>WorkArea:</b> ASSESSMENT/INSPECTIONS ACTIVITIES	
<b>Project Address:</b> Industrial Blvd.		<b>Activity:</b> Site Reassessment (SR)	
<b>County:</b> Terrebonne		<b>Work Area Code:</b>	
<b>City, State:</b> Houma, La		<b>Activity Code:</b> RS	
<b>Zip:</b> 70360		<b>EMERGENCY CODE:</b> <input type="checkbox"/> KAT <input type="checkbox"/> RIT	
<b>! SSID:</b> 06GC		<b>FPN:</b>	
<b>CERCLIS:</b> LAD058475419		<b>Performance Based:</b> No	
<b>Operable Unit:</b>			
<b>Authorized TDD Ceiling:</b>	<b>Cost/Fee</b>	<b>LOE (Hours)</b>	
<b>Previous Action(s):</b>	\$17,700.00	0.0	
<b>This Action:</b>	\$20,000.00	0.0	
<b>New Total:</b>	\$37,700.00	0.0	

**Specific Elements** Gather and evaluate new information on a site previously assessed under the Superfund program.

**Description of Work:**

All activities performed in support of this TDD shall be in accordance with the contract and TO PWS.

Amendment C extends the TDD to 10/02/2012 and adds additional funding for coordinated sampling with removal and for completion of a sampling trip report.

Amendment B adds the additional element of creating an electronic scribe data file for site information and provides an additional \$2700 for cost of this action.

Amendment A extends the POP to 08/01/2012 to allow time for EPA to initiate early PRP searches. In addition deliverable will include draft sampling plan. There is no increase in cost/fee.

Conduct a site re-assessment of the Delta Shipyard Facility, coordinate with Site Assessment Manager Brenda Cook to obtain copies of all existing federal and state documents including all analytical data, site assessments reports generated through the state clean-up of this facility. Perform review of analytical data to determine its appropriateness for NPL listing, gather pertinent target information and prepare a HRS site score using Quickscore to determine NPL eligibility for potential NPL inclusion of this site. Conduct an on-site recon of the site/meet with EPA SAM and LDEQ to gather all existing data. Deliverable to be a cover memorandum summarizing the existing data, targets, and detailing any known data gaps and draft HRS score sheets using the HRS quick-score or word perfect templates.

**Accounting and Appropriation Information**

SFO: 22

Line	DCN	IFMS	Budget/ FY	Appropriati on Code	Budget Org Code	Program Element	Object Class	Site Project	Cost Org Code	Amount
1	PLC0024	XXX	11	T	6A00P	302DD2C	2505	06GCRS00	c001	\$20,000.00

Funding Summary:	Funding
Previous:	\$17,700.00
This Action:	\$20,000.00
Total:	\$37,700.00

**Funding Category**

Removal

**Section**

- Signed by Brenda Cook/R6/USEPA/US on 05/31/2012 10:08:31 AM, according to Abel Farias/start6/r

: Brenda Cook

Date: 05/31/2012

**Phone #:**

Project Officer Section - Signed by Linda Carter/R6/USEPA/US on 06/01/2012 06:45:27 AM, according to Al

Project Officer: Linda Carter

Date: 05/31/2012

Contracting Officer Section - Signed by Cora Stanley/R6/USEPA/US on 05/31/2012 12:33:56 PM, according

Contracting Officer: Cora Stanley

Date: 05/31/2012

Contractor Section - Signed by Cecilia Shappee/start6/rfw-start/us on 06/01/2012 03:50:53 PM, accordir

- ☒ No During the past three (3) calendar years has your company , or any of your employees that will  
☐ Yes be working at this site , previously performed work at this site /facility?

Contractor Contact: Cecilia Shappee

Date: 06/01/2012